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Review of U.S. - Mexico Environmental Issues

February 1992

REVIEW OF U.S.- MEXICO ENVIRONMENTAL ISSUES
FEBRUARY 25, 1992

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REVIEW OF U.S.-MEXICO ENVIRONMENTAL ISSUES

EXECUTIVE SUMMARY

In the "Response of the Administration to Issues Raised in Connection with the Negotiation of a North American Free Trade Agreement," provided to Congress on May 1, 1991, the Administration undertook to provide a review of U.S.-Mexico environmental issues with particular emphasis on the possible environmental effects of a NAFTA. This Review was conducted by an interagency task force coordinated by the Office of the U.S. Trade Representative in parallel with negotiations of the NAFTA. A draft was issued for public comment in October 1991. Key conclusions of the Review are summarized below.

AN INTENSIFIED COOPERATIVE RELATIONSHIP FOR ENVIRONMENTAL PROTECTION

- The U.S. and Mexico have worked together for many years on environmental problems, particularly as they affect the border region.

- As momentum has built behind a North American Free Trade Agreement, the nature and extent of such cooperative activities has expanded.

- U.S.-Mexican environmental activities are high priorities for each country and are built upon:

  -- formal bilateral agreements covering the border area environment, boundary and water issues, and cooperation on the conservation of natural resources and in addressing Mexico City air pollution;

  -- international agreements such as the Montreal Protocol on Ozone Depleting Substances, the Convention on International Trade in Endangered Species and the Basel Convention on the Transboundary Movement of Hazardous Wastes and Their Disposal;

  -- the environmental statutes and enforcement authorities of each country (Mexico's 1988 Environmental Law is in many respects comparable to U.S. law, in the context of Mexico's civil law system which places greater emphasis on administrative action.).

- In November 1990, Presidents Bush and Salinas directed the preparation of an Integrated Environmental Plan for the Mexican-U.S. Border Area (Border Plan). A draft Border Plan was prepared by a bilateral working group and released in August for public comment. The

final Border Plan is being released by the U.S. Environmental Protection Agency (EPA) and the Mexico Secretaria de Desarrollo Urbano y Ecologia (SEDUE) together with this study. The fundamental Border Plan priorities are:

-- to control industrial and municipal discharges into surface waters to prevent and/or reduce contamination of surface and subsurface waters;

-- to monitor and track the movement of hazardous wastes to ensure environmentally sound disposal and prevent contamination of surface or subsurface waters;

-- to prevent air pollution which exceeds ambient standards by controlling stationary, area, fugitive and mobile source emissions;

-- to develop contingency and emergency response plans for hazardous material emergencies.

o To address these priorities, the Border Plan identifies action items in the areas of: enforcement of existing laws, initiatives to reduce pollution, cooperative planning and training, and development of an environmental data base.

NAFTA NEGOTIATIONS

o Negotiations on a NAFTA began June 12, 1991 and are well advanced. From the outset, Mexico, Canada and the U.S. agreed that a NAFTA must cover trade in goods, services, intellectual property, and investment.

o A NAFTA will be consistent with GATT requirements for free trade areas (as set forth in GATT Article XXIV).

o In accordance with its May 1 commitment to Congress, the U.S. has informed Canada and Mexico that in a NAFTA it must:

-- maintain the right to prohibit the entry of goods that do not meet U.S. health, safety, pesticide, food and drug, and environmental regulations, so long as such regulations are based on sound science, do not arbitrarily discriminate against imports or constitute a "disguised" trade barrier.

-- maintain the right, consistent with other international obligations, to limit trade in items or products controlled by international treaties to which the U.S. is party.

- In addition it is expected that a NAFTA will provide for: the phased elimination of tariffs among the three countries over a period of at least 10 years; elaborated rules of origin for North American trade; obligations on governments for treatment of investors, including in many cases standards of national treatment; rights of entry and nondiscriminatory treatment for services providers; standards of treatment for intellectual property; and a mechanism for settlement of disputes pertaining to agreement provisions.

- Studies show a NAFTA will generate positive economic benefits for all three countries, with the largest relative increase accruing to Mexico, given the smaller size of its economy and the higher level of its existing trade barriers.

POSSIBLE ENVIRONMENTAL EFFECTS OF A NAFTA: THE BORDER AREA

- The U.S.-Mexico border area currently faces a variety of environmental problems characteristic of expanding urban areas where infrastructure and environmental enforcement have not kept pace with rapid growth.

- In the past, rapid border growth has been due to the establishment and expansion of the "maquiladoras," assembly-oriented manufacturing plants that benefit from Mexican Government incentives for firms that export most or all of their production.

- Among other things, maquiladoras are allowed to import components free of Mexican duty when the products are exported. Until recently, maquiladoras were compelled to locate in the border region.

- With implementation of the NAFTA, maquiladora firms will become more like domestic Mexican firms. They will be able to use domestic or NAFTA-sourced imports without distinction. They will be able to sell their output in Mexico or abroad, depending on market opportunities.

- What will this mean for border area investment and growth? Two scenarios present the range of possibilities:

  -- Scenario 1, in which investment and production in the border region is assumed to grow at the same accelerated rate as that of the rest of Mexico, with the new border growth attributable to investments by firms new to Mexico locating close to the border to minimize risk and maximize their use of border area transportation and support services.

-- Scenario 2, in which firms respond to the change in trade status by increasingly locating new facilities further south in Mexico to be closer to Mexican domestic markets and suppliers and to avoid the higher labor costs and turnover of the border region.

o Without a NAFTA, however, the border area could be under as much or more stress, as it is reasonable to expect the Mexican Government to put increasing emphasis on the maquiladora sector, while limiting the ability of such firms to sell into the domestic market.

o The growth estimates are similar among the three scenarios, and the range of growth possibilities is quite wide. The uncertainty in the forecast range reflects the large number of variables influencing the border's growth, regardless of a NAFTA. In this regard, we anticipate that a NAFTA will have a moderate influence on the underlying growth factors, slightly accelerating border growth in scenario 1 from what it would have been, and slowing border growth in scenario 2.

o Completion and implementation of the NAFTA also is likely to strengthen the two countries' commitment to cross-border environmental cooperation, while allowing the Mexican Government to raise through taxation and fees additional resources for environmental protection and infrastructure development.

o Against the backdrop of these scenarios, environmental media-specific effects in the border region include:

Air Quality:

-- Carbon monoxide and ozone levels currently exceed federal standards in El Paso/Juarez and San Diego/Tijuana. Fine particulate standards are also exceeded in El Paso/Juarez and portions of six other border counties.

-- Under scenario 1, and the same policy cooperation assumptions, total emissions growth could range between 0% and +165% over 10 years.

-- Under scenario 2 for NAFTA effects, combined with the level of U.S.-Mexico policy cooperation contemplated in the Border Plan, emissions growth could range from -20% to +85% over ten years to 2001.

-- The least favorable air quality scenario would occur in no-NAFTA case, with continued strong growth in the maquiladora sector and lessened policy cooperation with the U.S. The range of

emissions growth in this case is +40% to +225% over 10 years.

-- A no-NAFTA scenario with a high level of cooperation is more encouraging, with a -10% to +125% range for emissions growth. This would be more favorable than the NAFTA scenario 1, but still not as favorable as the NAFTA scenario 2.

Water Quality:

-- Water problems in the border area include: contamination of surface and ground waters from inadequate wastewater treatment and increasing demand on water availability, with a potential for damage to aquifers and surface water flows.

-- As with air quality, with or without a NAFTA, growth in the border region will present the greatest obstacle to achieving and maintaining clean water. Unlike air, however, water scarcities may actually serve to curb growth, although it is not possible to predict when this may occur.

-- Increased demand for water may also lead to enhanced water treatment in order to make wastewater available for other uses.

-- Growing demand for water could have severe impacts on wetland and other aquatic wildlife habitats unless these areas are protected both on the U.S. and Mexican sides of the border.

Hazardous and Municipal Wastes:

-- Mexican law currently requires that hazardous wastes generated at maquiladora industries from U.S. raw materials be exported to the U.S. for management. It is believed that only 31% of maquiladoras are currently complying with this requirement (SEDUE, October 1991). As a result, the U.S. and Mexico have initiated a number of steps, including enforcement actions, to improve overall compliance.

-- U.S. border states currently have adequate hazardous waste management capacity for the hazardous wastes they receive from Mexico, which is only a small portion of waste managed in these states. The need for future capacity in either country that might be associated with the NAFTA, and with the efforts of the U.S. and Mexican governments in improving compliance with maquiladora requirements, is not known.

-- The U.S. and Mexico have signed (and Mexico has ratified) the Basel Convention which addresses transboundary movements of hazardous wastes, municipal wastes, and municipal incinerator ash. When in force, the convention will require government notice and consent prior to export and will use a standard of environmentally sound management for all transboundary waste movements.

-- In time, it is anticipated that the NAFTA will result in an elimination of the legal distinctions of the maquiladora program, as its duty incentives are phased out. (Maquiladora facilities are likely to continue to be in use, however.) As a result, increasing proportions of hazardous wastes generated in Mexico might well be disposed of in Mexico, rather than exported to the U.S. This would require additional hazardous waste management capacity in Mexico. If the NAFTA allows for the entry of U.S. hazardous waste management firms into the Mexican market, their presence should assist Mexico in developing enhanced hazardous waste management capacity. In addition, EPA is a source of technical assistance in the area of permitting of waste management facilities in order to ensure environmentally sound disposal.

-- Without a NAFTA, continued (and perhaps increased) growth of the maquiladora sector could result in increases in the volume of hazardous waste exported to the U.S. in compliance with Mexican maquiladora law.

Chemical Emergencies:

-- Growth in the border area could result in an increased risk of chemical emergencies, if the incidence of accidents in chemical production, storage or transport remains constant.

-- The U.S. and Mexico have established an Inland Joint Response Team (JRT) to coordinate emergency preparedness and response activities. The JRT has not yet been activated for an emergency, but members of the team have assisted in the resolution of several incidents in three border communities.

Endangered Species and Wildlife:

-- About 50 endangered species and over 100 "candidate" endangered species may be potentially affected by growth in the border region and Northern Mexico.

-- Increased use of water for industry, residences and agriculture could alter rivers, springs and wetlands and remove brush habitat. If not designed with species protection in mind, additional international bridges over the Rio Grande could destroy habitats, aggravate flooding and increase human presence in refuge areas.

-- Depending on inspection procedures, there is a risk that increased commerce could disguise an increase in the illegal commerce in endangered wildlife.

POSSIBLE ENVIRONMENTAL EFFECTS OF THE NAFTA: INVESTMENT

o There have been concerns expressed that the NAFTA will lead to "pollution haven" investment motivated by lower environmental requirements or weaker enforcement in Mexico.

o Despite such concerns, studies of investment flows have shown neither significant nor systematic effects of differing environmental policies internationally, or even between U.S. states.

o For NAFTA to have a significant potential effect on the location of investment for environmental reasons, the following conditions must apply:

-- environmental compliance costs must represent a significant portion of total operating costs;

-- existing trade barriers must be significant;

-- costs associated with relocating an industry or creating new capacity must not exceed compliance cost gains; and,

-- environmental compliance costs must be sufficiently different in the alternative sites to encourage investment based on these differences.

o The evidence suggests that these four conditions are rarely met in U.S.-Mexican trade.

-- Pollution abatement costs make up a small share of costs for most industries, averaging only 1.1 % of value added for all industries; 86% of industries have abatement costs of 2% or less.

-- Most industries with high pollution abatement costs have low U.S. tariffs, either on a most-favored-nation basis or Mexican exports are currently eligible for zero duties under GSP

(Generalized System of Preferences). Only 11 out of 442 U.S. industrial sectors have both significant abatement costs and relatively high trade protection in the U.S.

-- The 11 industries also tend to be very capital intensive, however, which means there are relatively high costs for shutting down in one location and opening elsewhere, or adding new capacity. These costs may well overwhelm any compliance cost savings.

-- Finally, there may not be now or in the future a significant difference in Mexican environmental requirements. This is especially true of large, capital intensive industries likely to meet the other three conditions. And all new investors in Mexico are required to submit an environmental plan to detail the potential environmental impact of facilities and specify their abatement plans. Mexico authorizes new investments only after review of these compliance plans.

POSSIBLE ENVIRONMENTAL EFFECTS OF A NAFTA: OTHER ISSUES

- To the extent that increased trade follows implementation of a NAFTA, land transportation traffic would increase with potential impacts on air quality, noise and congestion at crossing and transit routes.

- If a NAFTA liberalizes truck and bus access to Mexico, moreover, lack of low sulfur diesel fuel on Mexican highways may cause damage to vehicle emissions equipment.

- Liberalization of transportation services can also be expected to reduce deadheading by empty vehicles and obviate the requirement that many cargos be transferred at border stations, both of which would have a positive environmental impact.

- There has been a concern that NAFTA provisions on product standards, technical regulations and conformity assessment procedures could be used to successfully challenge U.S. health, safety or environmental standards as "unjustified" trade barriers.

- As noted above, the Administration has made a firm commitment to preserve the right to maintain stringent health, safety or environmental standards, and to maintain the right to exclude products that do not meet such requirements. Accordingly, standards, technical regulations and conformity assessment procedures based on a scientific justification or a

consequence of a level of risk the U.S. considers acceptable will not be subject to successful challenge under the NAFTA.

- If included in a NAFTA, certain energy provisions can have significant, positive environmental impacts in the following ways:

  -- Provisions liberalizing conditions for the sale of natural gas to Mexican industrial and household markets can help make gas available to substitute for the widespread use of high-sulfur fuel oil, particularly in the northern areas of Mexico near the U.S. border. This would affect air quality in the region and could also reduce CO2 emissions.

  -- Severe capital constraints on the state oil company have hampered the modernization of Mexican refineries. (President Salinas closed the largest refinery in Mexico City to help combat air pollution.) Mexico is not able to produce sufficient refined oil products for domestic consumption, especially modern vehicle fuels. NAFTA provisions that allowed for capital mobilization for investment in refining capacity would allow reductions to be made in pollution at such refineries and help increase the supply of cleaner fuels.

  -- Provisions liberalizing terms for foreign investment in petrochemicals can have similar positive effects. An example is Mexico's recent regulatory change to allow foreign investment in a plant to produce Methal Tertiary Butyl Ether (MTBE), an additive used to replace lead in gasoline. This change allowed Mexico to attract private investment in a state-of-the-art facility and to greatly increase availability of lead-free gasoline throughout the country.

  -- Provisions to reduce barriers to cross-border electricity trade and co-generation projects can have the effect of backing out older, less efficient and polluting fuel oil generation facilities (particularly in northern Mexico).

- Demographic pressures in Mexico are fueling the rapid growth of Mexico City and the northern border regions. While rates of population growth have slowed over the past decade, considerable momentum is built into Mexico's future population growth by the postwar period of rapid population increase.

- Mexico will remain a young country demographically. Approximately one million people enter Mexico's labor force each year, compared with two million new job

seekers in the U.S. which has a population three times that of Mexico.

- Traditionally, the unemployed have moved to Mexico City or the northern border regions (and from there often illegally to the U.S.). Growth stemming from a NAFTA may help in absorbing this labor force growth in small and medium sized cities with fewer adverse environmental consequences.

- A NAFTA establishing free trade in timber products is not likely to have a direct effect on deforestation in Mexico. Most of the deforestation takes place in the tropical forests of the south to clear land for subsistence agriculture.

- Even liberalization of agricultural trade is likely to have little direct effect on land clearing for subsistence agriculture problem, since U.S. and Canadian agricultural commodities for the most part do not directly compete against these subsistence farmers. In addition, if feasible in conjunction with a GATT Uruguay Round Agreement, restraints on agricultural subsidies may have the effect of reducing excessive fertilizer and pesticide use.

- Over time, faster economic growth and job opportunities throughout Mexico that would likely follow implementation of a NAFTA may be expected to reduce agricultural pressures on tropical forests.

ENVIRONMENTAL POLICY AND PROGRAM OPTIONS

- A wide variety of environmental policy and program options can help minimize any adverse effects of the NAFTA and assist Mexico in its efforts to improve environmental protection. Many of these options have been identified in the course of the development of the Border Plan, while others have been identified in the course of this Review (including public hearings held to gather public input on the NAFTA). These policy and program options will be pursued in the context of the U.S.-Mexico environmental cooperation proceeding in parallel to the NAFTA negotiations.

- Among these environmental policy and program options are the following:

  -- Mexico's environmental protection agency (SEDUE) and EPA will be compiling emissions inventories of border communities, estimating requirements for attaining control levels and performing air modelling analysis to evaluate the changes that would result from airshed-wide emissions reductions.

-- Based on such data, SEDUE and EPA will develop realistic air quality control strategy scenarios.

-- SEDUE plans to begin inspection and maintenance programs for government and fleet vehicles in the Juarez and Tijuana areas. Inspection and maintenance programs are currently underway in Monterey and Mexico City.

-- The U.S. and Mexico will be determining the priority needs for water supply, treatment and distribution systems for existing and future development in the border area sister cities.

-- The U.S. and Mexico will develop and implement a cooperative agreement to assure compliance with all applicable regulations in order to minimize pollution to water resources from industrial sources in the border area.

-- Environmental Round Table meetings will be established at the local, state and border area levels to provide a forum for the exchange of ideas and discussion of environmental problems.

-- EPA and SEDUE will consider the establishment of a private sector outreach program to encourage voluntary pollution reduction agreements with the private sector, and to provide pollution prevention technology seminars for maquiladora and other border area industries.

-- EPA and SEDUE will be conducting multimedia inspections of hazardous materials treatment facilities in pairs of border cities, and developing an improved training program.

-- SEDUE has contracted for the design of technically advanced landfills for Tijuana, Nogales, Juarez, Nuevo Laredo and other border communities to enable proper disposal of future municipal solid waste.

-- EPA has maintained close cooperation with SEDUE as it has developed environmental regulations under Mexico's 1988 environmental statute.

-- The Department of State and the Overseas Private Investment Corporation (OPIC) will work to complete an OPIC agreement with Mexico that will permit OPIC insurance, finance and advisory programs to be offered to investors that meet OPIC's environmental standards.

-- Customs and the Immigration and Naturalization Service (INS) will be considering means to

inform long distance transport operators of average border transit times at various border crossing points in order to reduce congestion.

-- Led by the U.S. Department of Transportation, a special interagency group will work with counterpart Mexican agencies to evaluate the extent of the congestion problem along the U.S.-Mexico border, identify the causes of the congestion, and recommend solutions. In particular, the group will look at low-cost, non-technical remedies to congestion problems.

-- New construction of border crossing facilities and expansion of existing facilities will be continued. Environmental analysis will be conducted of all new bridges and highway corridors, to identify, inter alia, border area wildlife habitats which may be affected by such projects.

-- AID will be continuing to fund a major study of small and mid-sized urban areas outside the Mexico City-Guadalajara-Monterrey areas that would offer the best prospects for economic growth and alternative destination for rural Mexican emigrants.

-- EPA will be working with Mexican pesticide regulatory authorities to compare lists of registered pesticides in each country, to identify Mexican pesticide applications that are not authorized in the U.S., and to determine whether alternative U.S.-registered pesticides could be substituted or U.S. registration pursued in such cases.

-- The U.S. Food and Drug Administration (FDA) will be working with Mexican authorities to develop a sampling and testing system to determine incidence and levels of pesticide residues in order to target areas for FDA and EPA cooperation toward reduction of the use of pesticide applications that are not authorized in the U.S. and reduction of pesticide levels.

RECOMMENDATIONS FOR NAFTA NEGOTIATIONS

o Flowing from the analysis in this Review are a number of specific negotiating proposals that, if accepted by Mexico and Canada, would tend to reinforce the potential positive environmental effects of the NAFTA or mitigate the potential adverse effects.

- These negotiating proposals would be compatible with the overall NAFTA objectives set forth by the Administration.

- The following represents a list of such recommendations for the negotiating teams:

  -- To encourage availability of the best environmental expertise, include U.S. environmental engineering, hazardous and municipal waste management, and treatment services firms and professionals as part of the investment and services negotiations seeking national treatment and liberalized rights of entry.

  -- Seek elimination of duty drawback and other duty remission programs after a phase-in period to reduce the incentives to the establishment of export-only maquiladora plants (which tend to be located disproportionately in border areas).

  -- Maintain the right to prohibit the entry of goods that do not meet U.S. health, safety, pesticide, food and drug, and environmental regulations, so long as such regulations are based on sound science, do not arbitrarily discriminate against imports or constitute a "disguised" trade barrier.

  -- Maintain the right, consistent with other international obligations, to limit trade in items or products controlled by international treaties to which the U.S. is party.

  -- Develop dispute resolution mechanisms that are sensitive to environmental and health programs and values.

  -- Facilitate trade in cleaner, more environmentally sound forms of energy such as natural gas and electricity, based on market forces.

  -- Promote investment in state-of-the-art energy technologies to enhance environmental objectives.

  -- To assure that the potential environmental effects of increased cross-border transportation resulting from the NAFTA are mitigated by an efficient transportation system in Mexico and the United States, the NAFTA negotiators should work to resolve existing access problems for motor carriers and railroads on both sides of the border.

- The Administration has included environmental and health officials on NAFTA negotiating groups and policy coordination committees to ensure that during the development of the agreement the negotiators are alert to environmental sensitivities and additional negotiating opportunities.

INTRODUCTION

A. BACKGROUND AND SCOPE

In his "Response to Issues Raised in Connection with the Negotiation of a North American Free Trade Agreement" transmitted to Congress on May 1, 1991, the President committed the Administration to undertake a review of U.S.-Mexico environmental issues, including an analysis of the possible environmental effects of a free trade agreement. This study, Review of U.S.-Mexico Environmental Issues (Review) is presented in final form to Congress and the public to advance discussion and understanding of U.S. - Mexico environmental issues, including those related to the North American Free Trade Agreement.

The Review and an earlier draft released for public comment were prepared by an interagency task force, coordinated by the Office of the U.S. Trade Representative. The task force included representatives from the Departments of State, Treasury, Commerce, Transportation, Agriculture, Justice, Interior, Health and Human Services, Energy, and Labor; the Environmental Protection Agency; the Council on Environmental Quality, the Council of Economic Advisors; and the Office of Management and Budget. In designing the study outline and as the analysis progressed, the task force sought and received advice and input from interested non-governmental organizations, business firms, unions, associations, and private individuals.

The Administration also solicited public comment on the proposed agreement, including its environmental effects, in a Federal Register Notice of July 16, 1991, and held a series of public hearings in six cities between August 21 and September 11, 1991. Over 40 witnesses took advantage of this opportunity to provide information, concrete examples and policy advice on the possible environmental effects of the North American Free Trade Agreement (NAFTA). In all over 260 witnesses presented testimony on all aspects of the NAFTA and over 400 written submissions were received. Transcripts of the hearings and reference copies of the written submissions are available for public inspection at the Office of the U.S. Trade Representative (Room 101, 600 17th Street NW, Washington, D.C. 20506). All the comments received from the public have been distributed to members of the task force and to leaders of relevant NAFTA negotiating teams and were considered in the preparation of the Review.

The United States, Mexico and Canada began negotiation of a North American Free Trade Agreement (NAFTA) on June 12, 1991, following the extension by the U.S. Congress of fast track procedures for the consideration of trade agreements. A NAFTA would reduce barriers to trade and

investment among the three nations and create a market of 360 million people with a gross product in excess of $6 trillion. A NAFTA would create important new opportunities for U.S. workers, U.S. exports, and U.S. economic growth.

As described in this report, the U.S.-Mexico relationship on environmental and conservation matters long precedes the decision to explore a NAFTA. Therefore, it is useful to take stock of the full scope of the environmental relationship and consider how a NAFTA might affect that relationship or pose new issues.

Both Mexico and Canada have begun similar assessments of environmental issues relevant to the trade negotiations. In part because the Review offers recommendations to those involved in ongoing negotiations, however, it was not coordinated in advance with Canada or Mexico. And, although the Review was published in draft form on October 17, 1991, neither the Canadian nor Mexican Governments have provided comments on it to the U.S. Government.

This Review is comprised of four sections.

- Part I is a comprehensive review of the U.S.-Mexico environmental relationship, including a status report on recent initiatives.

- Part II is a summary of the main elements of the NAFTA under negotiation. While respectful of trilateral agreements reached on the scope of the agreement, even at this stage of the negotiation the description of a possible NAFTA is necessarily abstract and represents neither a U.S. negotiating position nor a forecast of what the final shape of the agreement will be.

- Part III is an analysis of possible environmental issues raised in conjunction with a NAFTA. Since potential border zone environmental impacts in particular depend on the forecasted effect of the NAFTA on the location of industries in Mexico, this section begins with an examination of border zone growth scenarios. Other sub-sections of this part of the Review focus on specific environmental issues, noting where environmental policy or program options can help address such issues and presenting related recommendations for NAFTA negotiators in many cases.

- Part IV, Conclusions and Recommendations, draws together the findings and proposals for the consideration of policymakers, NAFTA negotiators, and the interested public.

In the May 1 "Response," the Administration made a commitment to Congress to publish a draft of this Review "in a timely fashion so that the information obtained may be taken into account, in particular, by U.S. officials in connection with the FTA negotiations and other consultations." As noted above, a first draft of this review was made available to the Congress, the general public, and to U.S. NAFTA negotiators on October 17, 1991. The release of the draft Review contributed to widespread discussion of the environmental implications of a NAFTA.

B. PUBLIC INPUT

Over 3000 copies of the October 17 draft Review were distributed by USTR and other U.S. Government agencies to members of Congress, state and local governments, and interested members of the public, particularly environmental groups and businesses with a particular interest in U.S.-Mexican environmental issues. The October 17 draft invited comment from the public on the analysis and conclusions presented therein.

Through January 30, 1992, USTR has received public comments from 48 individual organizations on the October 17 draft. All the public comments were thoughtful and, collectively, they were of great utility to the interagency team in the revision and updating of the analysis. Some of the comments were fully supportive of the Review's approach and endorsed the key findings of the first draft. Others were highly critical. Some of the commenters did not contest the major findings of the Review, but suggested that the Administration use the occasion of the negotiations to impose environmental regulations or conditionality on Mexico, backed up by the threat of withdrawal of trade provisions of the agreement if environmental policies and practices were not up to our standards.

While the interagency group has carefully considered in the revision process all the responses received, it should be noted at the outset that some of the proposals fall outside of the scope of the study and, if implemented, might even jeopardize the potential gains to U.S. national interests, and environmental protection in North America, that could flow from the successful negotiation of a NAFTA and the pursuance of a parellel program of environmental cooperation.

It should be kept in mind that the fundamental objective of the Review process is to identify whether the NAFTA itself may have adverse environmental impacts or undermine the ability of the U.S. to protect the environment, not the consideration of ways to utilize contingent reductions in trade barriers to extract

environmental conditionality. As is evident in the account of the negotiations presented in section II, the U.S., as the most open market among the three NAFTA countries, has relatively fewer barriers to offer up in the negotiations to create a genuine free trade area.

The full text of public comments received on the draft Environmental Review are available for public inspection in the USTR reading room, Room 101, Office of the U.S. Trade Representative, 600 17th Street NW, Washington D.C. 20506 and in many regional offices of the Environmental Protection Agency. In summary, however, the following are among the important themes contained in the public comments:

Insufficient Attention to the Environmental Impact of Growth on Rural Mexico. An important finding of the first draft of the Review was that the changes in economic incentives (most importantly, the opening of the domestic Mexican market) for the maquiladora sector may be expected to lead to proportionately greater new investment in medium and small sized Mexican cities in the interior of Mexico, lessening the nevironmental stress on the border area. This forecast was presented as one of two scenarios (the other, scenario 1, assumed that the border area would continue to attract the same historical share of new investment) for border growth.

The comments of several environmental groups accepted this premise as very possible, but critiqued the Review for failing to analyze the potential impact of this new growth on urban and rural Mexico away from the border area. It was pointed out that to the extent that industrial and agroindustrial growth takes place in areas ill-prepared for it in terms of infrastructure (water and waste treatment facilities, utility services and road networks, for example) or environmental regulatory enforcement personnel, there is a new threat of environmental degradation. Some have suggested the NAFTA should provide for a fee on new investors to finance infrastructural costs associated with new investment in such areas.

While this is a relevant consideration, it was not feasible to make extensive revisions to the Review to analyze fully the environmental consequences of growth in the interior areas. The U.S. government is not in a position to project with any accuracy the location of any future industrial growth away from the border area, nor the environmental issues associated with that growth. That will depend on the locational decisions of businesses, and the domestic policies of the Government of Mexico (current policies heavily discourage new investment in the congested Mexico City and Monterrey areas). And, as described in the Review, SEDUE, the Mexican government's environmental protection agency, is now requiring each new investor to

file environmental assessments and compliance plans with all new investment applications. As far environmental infrastructural needs, the Mexican government has full authority to either require environmental mitigation measures (such as pretreatment of waste water) by new investors (as is consistent with the "polluter pays principle"), or to tax or charge fees to firms and citizens in the affected areas to recover the costs of infrastructural investments.

The U.S. government has been playing a role in helping Mexico assess the absorption capacities of small and medium sized cities through AID financial assistance to a comprehensive multiyear study in this regard described further in Section III.I.3 in the Review. In addition, it is expected that the issue of the environmental impact of grwoth away from the border will receive more extensive treatment in the Mexican government's own forthcoming environmental review.

Public Health Issues. Another common critique of the first draft of the Review was that it paid insufficient attention to public health issues. While there was acknowledgement of the public health consequences of environmental degradation in the border areas in "media specific" sections on border environmental issues (such as air quality, water quality, hazardous waste and pesticides) this revision incorporates a new section on public health issues. As with other environmental impacts, the potential effect of the NAFTA on public health (on both sides of the border) is mixed. Important public health risks are mainly related to extreme poverty in the region, and as the NAFTA provides more job opportunities, cash income and tax revenues in the area, threats to public health should ease. The topic is explored at greater length in Section III, C.9.

Energy Efficiency. Several commenters faulted the Administration's first draft of the Review for neglecting to pay sufficient attention to the possibility of environmental advantages to be obtained from greater energy efficiency. The energy section of the Review was found to be too heavily weighted towards the identification of potential environmental benefits to liberalized trade and investment opportunities in the energy sector. Some commenters were concerned in particular that the Administration's interest in opening oil and gas exploration and production to participation by American firms (in ways consistent with Mexico's Constitution) would lead to greater aggregate production of fossil fuels at lower cost, contrary to global warming objectives.

Some of these points were taken into account in a thorough redraft of Section III.H., which in the process also was made more consistent with the Administration's

National Energy Strategy. In general, a free trade agreement, aimed at reducing barriers to trade and investment, will increase energy efficiency by ensuring that all sectors of the North American economies respond to market prices for energy commodities, free of subsidies and other distortions. In Mexico, the Salinas Administration has undertaken a dramatic reform of PEMEX and CFE (the state petroleum and electricity monopolies, respectively), aimed at ensuring that energy products are priced domestically at international prices. In addition, in December the Mexican Government cut by half the price diffential between leaded and unleaded gasolines, in order to encourage greater use of the cleaner unleaded fuel. Such more realistic price levels will go far to ending the wasteful production practices of the past, which were made possible by the low energy prices too common among oil exporting nations.

In NAFTA, the U.S. is seeking to lock-in Mexican market pricing policies for the future, which will allow our firms to compete in traded goods with Mexico's on a level playing field and allow U.S. investors to construct efficient, world class petrochemical facilities. Given the complexity of energy markets it is as yet uncertain as to whether an operational definition of such market pricing policies can be devised.

As to the possibility that NAFTA provisions may allow for greater participation by U.S. firms in production of oil and gas in Mexico, this has aroused a considerable controversy in Mexico. Mexican President Salinas and other Mexican officials have stated that NAFTA must be respectful of Mexico's Constitutional reservation of hydrocarbon resources to the state, and the U.S. has accepted that stipulation. Increased involvement of U.S. frims in Mexico's oil and gas sector on a contractual basis, however, can bring state-of-the-art exploration and drilling techniques to Mexico's oil sector, allowing PEMEX to find and produce oil and gas with less waste and greater environmental sensitivity. In addition, the reduction in barriers to trade and investment in natural gas can promote greater use of this cleaner, more environmentally benign fuel.

In the electricity sector, Mexico and the U.S. are exploring NAFTA formulas to promote investment in cogeneration, which also would promote energy efficiency.

Product Standards. Some of the commenters on the first draft of the Review expressed concern that the discussion of product standards therein signalled a weakening of the Administration's resolve to meet its May 1 commitments on product standards, especially the commitment that the U.S. "will not agree to weaken U.S.

environmental and health laws or regulations as part of the FTA, and will maintain enforcement of them."

In the NAFTA negotiations, the Administration remains steadfast in its insistence on standards provisions which protect our ability to establish and enforce through trade restrictions stringent product standards and technical regulations based on a scientific justification or a domestic assessment of an acceptable level of risk. The first draft's product standards section was very clear in this regard. Accordingly, only minor changes have been made in the final version to clarify how the U.S. seeks to have environmental and scientific standards issues handled in any dispute resolution processes.

Maritime Issues. One commenter pointed out that the discussion of transport issues in the first draft did not deal with maritime modes of transport, which are generally more energy efficient and less polluting than competing land transport modes such as trucking. This oversight stemmed from the fact that the U.S. has not agreed to coverage of maritime transport services in the NAFTA, given the maritime industry's importance to our national security, and the fact that, as with Canada, economic factors mean that U.S.-Mexican trade flows now overwhelmingly travel by truck and rail, given our long land border with Mexico.

Nevertheless, in the present revision of the Review, a discussion of maritime transport issues has been added under Section III.E.3.c. This should not be taken as an indication that the U.S. is prepared to negotiate reciprocal reductions to maritime services barriers, however.

I. REVIEW OF U.S. - MEXICO ENVIRONMENTAL RELATIONSHIP

A. BACKGROUND

1. The History of U.S.- Mexico Bilateral Cooperation in Environmental Affairs

a. Introduction

Cooperation between the United States and Mexico on environmental issues has intensified in recent years, particularly as a result of growing concern over the range of pollution problems in the border area. Initially, the two governments collaborated primarily on issues involving the use and quality of the waters of their shared river basins. Expanded industrial activity in the border area, and consequent increases in population, air pollution, hazardous waste generation, and the potential for environmental accidents have posed new challenges. These factors, combined with increased awareness of the adverse effects of environmental degradation, have stimulated new cooperative efforts in the past decade to address these problems.

The U.S.-Mexico bilateral relationship on environmental issues is one of the strongest enjoyed by either country. It is of great interest to the Presidents of the two countries, and has been a central topic of discussion at their last three summit meetings. This is reflected in the cooperative relationship that exists between counterparts in the U.S. and Mexican federal environmental agencies and other U.S. and Mexican federal agencies with responsibilities for environmental matters, including environmental law enforcement. State and local authorities of both countries have historically worked together in such related areas as emergency response and municipal services.

The history of environmental cooperation between the United States of America and Mexico dates back over a century with the early agreements regulating the use of the waters of the Rio Grande. The cooperative relationship on water usage was expanded in the 1980's to cover a broad range of environmental concerns, including marine pollution, sanitation, hazardous substances and wastes, and air pollution. The U.S. and Mexico are currently parties to a large number of bilateral environmental agreements, including the Treaty on the Utilization of Waters of the Colorado and Tijuana Rivers, and the Rio Grande of 1944 (replacing the International Boundary Commission with the International Boundary and Water Commission), the 1983 Border Area Agreement, the 1989 Agreement relating to Mexico City, and the Integrated Environmental Plan for the Mexican - U.S. Border Area (the "Border Plan"). In

addition, the U.S. and Mexican governments continue to carry on extensive communications at an informal level. State and local authorities of both countries that share a common mandate (e.g., emergency response, municipal services) work together and exchange information.

b. Water Quality Issues and the IBWC

In 1944, the United States and Mexico replaced the International Boundary Commission, created by the two countries in 1889 to examine and settle boundary demarcation disputes, with the International Boundary and Water Commission (IBWC). The IBWC was given the authority to undertake projects dealing with, among other things, the quality, conservation, and utilization of water resources, as well as dam construction and flood control with regard to the Tijuana, Rio Grande, New, and Colorado rivers. Most important, the U.S. and Mexican governments agreed "to give preferential attention to the solution of all border sanitation problems."

The IBWC consists of one U.S. and one Mexican Engineer-Commissioner, each of whom heads a national "section" composed of engineering and legal advisers. The Commissioners enter into specific agreements relating to the planning, construction, operation, and maintenance of joint projects on the border rivers, subject to the approval of the two governments. The Commission also acts as a vehicle for water quality monitoring and data collection and has limited jurisdiction over groundwater as well as surface waters.

The IBWC implements provisions of the 1944 Treaty relating to the division of the use of the international waters, to the economic and social benefit of people in both countries. Since its inception, the IBWC has constructed and operated flood control and water conservation projects along the Rio Grande and Tijuana Rivers, including two major dams along the Rio Grande. The IBWC also has successfully resolved several bi-national environmental disputes between the two countries. The Commission implemented settlement of the Chamizal land dispute in the El Paso/Ciudad Juarez area in 1967, and worked to resolve the international Colorado salinity problem six years later. At that time, the United States accepted an obligation to deliver less saline water to Mexico in return for a Mexican pledge to limit groundwater mining in the Yuma area. In 1980, the Commission developed specific water quality standards for the New River which Mexico agreed to meet through improving its wastewater treatment and collection systems.

The following are some of the wastewater treatment projects in which the IBWC has been involved, designated by

the "sister cities" along the U.S.-Mexican border which they are intended to serve:

(1) Tijuana/San Diego. Because the City of Tijuana was unable to convey and treat all of the wastewater it generated, in the 1960's the Commission arranged for the City of San Diego to treat Tijuana's wastewater whenever necessary. Mexico constructed additional pumping and treatment facilities for Tijuana in the interim. The U.S. and Mexico have committed to constructing a new international secondary sewage treatment plant south of San Diego which should be completed by early 1995.

(2) Mexicali/Calexico. The United States and Mexico are working to improve the wastewater system at Mexicali, where raw and partially treated sewage as well as agricultural and industrial waste enters the New River. The City of Mexicali has improved its municipal collection system. The IBWC has completed a $1.2 million project to begin the process of cleaning up the New River at Calexico/Mexicali.

(3) Nogales/Nogales. The wastewaters of both Nogales are treated at an international wastewater treatment plant north of the boundary built in 1951 and expanded in 1972. Nogales, Sonora has vastly expanded its sewer collection network over the past three years. In 1991, the IBWC will complete a major $12.3 million expansion of the international wastewater treatment plant. It also has completed an emergency project to divert and disinfect flows of sewage which currently run through the Nogales Wash from Nogales, Sonora to Nogales, Arizona.

(4) Nuevo Laredo/Laredo. Currently, Nuevo Laredo directly discharges in excess of 27 million gallons per day (mgd) of raw wastewater into the Rio Grande. The governments of the U.S., Mexico, and the state of Texas are constructing an international treatment plant on the Mexican side of the border that should be completed by 1994. U.S. funding for this project is approximately $24 million, including $22 million from the U.S. federal government and $2 million from the state of Texas. Mexico is expanding and rehabilitating the Nuevo Laredo wastewater sewer system to convey water to this plant.

(5) Naco/Naco. The IBWC helped to resolve the sanitation problem at Naco/Naco. The City of Naco, Sonora improved its wastewater collection, treatment, and disposal systems to prevent overflow that flowed into the United States.

The IBWC also has cooperated closely with EPA and SEDUE (Secretaria de Desarrollo Urbano y Ecologia of Mexico, Mexico's central ministry for environmental protection) in their role as National Coordinators of the 1983 Border Agreement, and is continuing to work on water quality projects in connection with the Border Plan now under preparation.

c. The 1983 Border Area Agreement

The 1983 Agreement between the United States and Mexico on Cooperation for the Protection and Improvement of the Environment in the Border Area (the "1983 Border Area Agreement" or the "Agreement"), signed by Presidents Reagan and de la Madrid in La Paz, Baja California, represented a landmark commitment to cooperatively address environmental issues in the border region. This Agreement built upon a number of cooperative arrangements instituted in the 1970's involving information exchange between EPA and the Mexican Under Secretariat of Environmental Improvement of the Mexican Secretariat of Health and Public Assistance, related to a memorandum of understanding between these two agencies dated June 19, 1978.

The Agreement, and its several Annexes, provides a framework for cooperation between the United States and Mexico on controlling sources of pollution that affect air, land, and water in a 100-kilometer area on each side of the international boundary. EPA and SEDUE as national coordinators of the Agreement, conduct annual meetings to review the manner in which it is being implemented. The coordinators have designated five work groups of technical experts to address issues involving air pollution, water pollution, hazardous waste, environmental accidents (the Joint Response Team), and enforcement (the Enforcement Working Group was established in June of 1991).

The working groups meet periodically, generally immediately before the annual National Coordinators meeting. These working groups to date have produced several Annexes to the Agreement addressing a number of specific pollution problems in the border region, and have achieved considerable progress in response to these problems.

Annex I to the 1983 Border Area Agreement (1985) concerns border sanitation problems at Tijuana/San Diego. The U.S. and Mexico agree to work together to ensure that the wastewater treatment facilities constructed to address these problems are constructed, operated and maintained properly, and to consult on any problems that arise. The Water Work Group established under the Agreement has coordinated its work with that of the IBWC and has played

an important role in the current efforts to reduce pollution in the border area river system.

Annex II to the 1983 Agreement (1985) establishes the framework for the "United States-Mexico Joint Contingency Plan" regarding polluting accidents along the joint inland international inland boundary by discharges of hazardous substances. The Joint Contingency Plan document was finalized in January, 1988. This Plan led to the designation of the Joint Response Team (JRT) consisting of U.S. and Mexican members to coordinate international hazardous substance emergency preparedness and response activities in the event of an environmental accident such as an oil or hazardous materials spill. Its establishment supplemented a 1980 Marine Oil Spill Agreement which had created a similar response capability with respect to marine spills. The JRT also serves as a conduit for information about each country's hazardous substance emergency preparedness and response activities.

On the U.S. side, an emergency response effort by the JRT is coordinated with designated state and local authorities under the United States' national contingency plan. Similar local committees are being developed on the Mexican side. The JRT also works on notification and early warning procedures in case of releases or threats of releases and the cross-border transport of equipment and personnel.

To date, there have been two educational conferences aimed at preparedness efforts for the pairs of sister cities along the border. There have also been 2 joint simulation-type emergency exercises along the border at Brownsville/ Matamoros and Calexico/Mexicali.

Annex III to the 1983 Agreement (1986) addresses issues involving transboundary shipments of hazardous waste and hazardous substances. In addition to enforcing their domestic laws regarding shipments of hazardous waste, the United States and Mexico agree to notification and consent procedures that must be fulfilled before any transboundary shipment of hazardous waste occurs. Each nation also agrees to readmit any shipment of hazardous waste returned to its border for any reason by the country of import as well as any hazardous waste generated from raw materials admitted "in-bond" from the other country for purposes of processing. Finally, with respect to hazardous substances, the nations agree to inform each other of regulatory actions banning or severely restricting a pesticide or other chemical and to give notice of any ongoing export of such hazardous substances that comes to their attention.

The hazardous waste work group is also working to identify hazardous waste sites in the border area and has conducted training programs for SEDUE, EPA, and U.S. state

and local inspectors. EPA and SEDUE officials are visiting various maquiladora facilities and their associated U.S. facilities so as to enhance enforcement efforts on both sides of the border.[1] The two agencies have also launched an educational program to publicize U.S. and Mexican regulatory requirements with respect to transboundary shipments of hazardous materials.

Annex IV to the 1983 Agreement (1987) addresses the problem of transboundary air pollution caused by copper smelters along the common border. This annex established maximum sulfur dioxide emissions limits for both new and existing copper smelting facilities in the border area. Copper smelter owners or operators are required to monitor emissions and submit reports on emissions that exceed the maximum levels. The air pollution working group is directed to meet regularly every six months to review the progress in abating smelter pollution and make recommendations to the national coordinators if necessary.

Annex V to the 1983 Agreement (1989) creates specified "study areas" within which Mexico and the U.S. have agreed to collect data on air pollutant concentrations, air pollutant transport, and the physical mechanisms facilitating this transport. The countries further agree to identify sources that are not meeting applicable air pollution control standards for selected pollutants as well as the type and extent of pollution control equipment or changes in management practice necessary to bring such sources into compliance. One study area (El Paso/Ciudad Juarez) has been created, where there is currently a cooperative EPA/SEDUE air quality study being conducted.

Annex V is currently being supplemented to include two additional study areas: the San Diego-Tijuana area and the Mexicali-Imperial County, California area.

Summaries of the implementation provisions of the action plans for air quality improvement in each of these three border areas have been included in the Border Plan.

In addition to these activities, significant technical training has been provided to border SEDUE staff, as is discussed in Section I.D.

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[1] Under Mexico's maquiladora law, industries based outside Mexico are permitted to bring capital equipment, components, and raw materials into mexico without paying import duties. The finished products of these industries, or "maquiladoras", then are exported to foreign markets, with duties owed only on the value added in Mexico.

d. Mexico City Agreement

There are currently two cooperative U.S./Mexico programs underway which focus on Mexico City: (1) in 1989, Mexico (SEDUE) and the U.S. (EPA) signed the Agreement on Cooperation for the Protection and Improvement of the Environment in the Metropolitan Area of Mexico City, and (2) in 1990, the Department of Energy and Mexico's Petroleos Mexicanos (PEMEX) signed a Memorandum of Understanding to undertake a Mexico City Air Quality Initiative (MARI).

Since the signing of the 1989 SEDUE/EPA Mexico City Agreement, several U.S. EPA-led delegations have travelled to Mexico City to share information and provide technical assistance. The Mexico City Agreement is being implemented through working groups on air, water, soil (hazardous waste), and environmental management/health. The following issues have been the subject of joint meetings on Mexico City environmental pollution.

- In March, 1990, a U.S. EPA technical information delegation travelled to Mexico to sponsor a technical information exchange workshop with the Solid Waste Division of the Federal District of Mexico (DDF), focusing on a variety of topics concerning municipal solid waste management.

- In July, 1990, an Office of Mobile Sources delegation reviewed Mexico City's Inspection and Maintenance (I/M) Program.

A host of Mexican education and training needs involving air and solid waste pollution are currently being addressed under the Mexico City Agreement (see discussion of Training, below).

The MARI program, sponsored jointly by the U.S. DOE and PEMEX, began in July 1990 and will continue for 3.5 years, with each side contributing $4.5 million dollars. Scientists and engineers from the Los Alamos National Energy Laboratory and the research arm of PEMEX, the Mexican Petroleum Institute (IMP) are cooperating in the joint research effort, with scientists from the SEDUE and EPA participating in the program.

The overall research objective of MARI continues to be the characterization and analysis of air pollutants, their sources and concentrations. In addition, atmospheric and chemical reaction computer models have been developed for use by Mexican authorities for purposes of evaluating several air quality improvement strategies for Mexico City. These modelling efforts have been designed to incorporate socioeconomic factors deemed applicable by the Mexican authorities for consideration of future air pollution

control programs in Mexico City. The MARI study is expected to be viewed by Mexican authorities as a model for studying air pollution in other urban areas in Mexico.

e. The Integrated Border Environmental Plan

The U.S. and Mexico have developed an Integrated Environmental Plan for the Mexican-U.S. Border Area (Border Plan), which has been revised and expanded in light of public comments. This Plan, which is discussed in more detail in Section I.B., below, is intended to identify important environmental issues in the border area, develop priorities for dealing with them, and examine alternative ways of solving the problems of air, soil, and water quality and of treatment and disposal of hazardous wastes. It was the subject of a series of public hearings conducted by EPA and SEDUE at 15 locations on both sides of the border between September 16 and 26, 1991. See Section I.B.

f. Other Cooperative Efforts

Accidental Releases. A Joint U.S./Mexico Contingency Plan for Accidental Releases Along the Border (JCP) was developed and presented to the Presidents of both countries in January 1988. The Contingency Plan supplemented the 1980 Agreement of Cooperation between Mexico and the United States regarding Pollution of the Marine Environment by Discharges of Hydrocarbons and other Hazardous Substances (implemented by the U.S. Coast Guard and the Mexican Navy), which established a similar mechanism for the marine area.

Conservation. There has long been considerable bilateral cooperation between the two countries in the conservation area. A more extensive discussion of this cooperation is included at Section I.E.

Pesticides. The United States and Mexico have informally cooperated for many years in the field of regulation of pesticides. This cooperation has focused particularly on the control of residues on agricultural products exported to the United States from Mexico. Through information exchange on the status of specific pesticides in the U.S., training of personnel in residue analysis, and joint programs to inform growers and exporters of U.S. requirements, the U.S. and Mexico seek to ensure that Mexican agricultural imports meet U.S. requirements for minimizing pesticide residues on foodstuffs. The Food and Drug Administration concluded a Memorandum of Agreement with the Mexican Secretariat for Agriculture and Hydraulic Resources in 1988 which formalized the components of cooperation between the two agencies.

In May, 1991, a Pesticides and Chemicals Delegation consisting of members of U.S. EPA, FDA, and USDA met with members from SEDUE, the Mexican Ministry of Health and the Mexican Ministry of Agriculture to gather and share information related to pesticides and food standards and the regulation of industrial chemicals. A follow-up mission took place in August, 1991.

Technology Clearinghouse. In July, 1991, an Environmental and Energy Efficiency Technology Clearinghouse Delegation travelled to Mexico. The Delegation, comprised of U.S. EPA, U.S. AID and the National Technology Transfer Center met with SEDUE, representatives from other governmental agencies, industry, academia and non-governmental environmental interest groups to discuss an environmental clearinghouse for Mexico. A clearinghouse prototype, containing environmental and energy databases available in the U.S., has been placed in Mexico at various sites.

Public Health. The Department of Health and Human Services and its counterpart, the Mexican Secretariat of Health and Public Assistance, work with their state and local colleagues in a unique binational health association - the Border Health Association, founded in 1942. This binational relationship consists of local, state and federal public health officials with administrative support by the Pan American Health Organization (PAHO) field office in El Paso. The continued interaction among U.S. and Mexican federal, state, and local entities address common concerns and objectives that emerge from border communities.

Global Climate Change. Since 1990, the Agency for International Development (AID) has been working with the government of Mexico and several Mexican and U.S. conservation organizations to implement a series of activities to diminish atmospheric levels of "greenhouse" gases. AID expects that this multi-year program will have a value of approximately 7 million dollars in the period 1990-1992. This program includes support for the protection and sustained management of priority parks and reserves which form part of Mexico's national system of protected areas, and the buffer zones surrounding these areas. For more information on such cooperative conservation efforts, see Section I.E.

In addition, AID is developing a technical exchange program with the Mexican Government to identify areas of closer cooperation in energy efficiency and increased reliance on renewable energy sources such as wind, solar and hybrid systems, with a view to helping Mexico reduce its reliance on fossil fuels, while enhancing U.S.-Mexico trade opportunities in renewable energy technologies.

2. National Laws Relating to Environmental Issues

a. Laws of the United States

In evaluating U.S. trade policy alternatives and the range of solutions to border area environmental problems, the principles and goals of major U.S. environmental legislation have been considered. These laws play the central role in protecting the environment of the U.S.

i. Framework of Substantive Rules

U.S. environmental and resource statutes date to the turn of the century. The majority of modern U.S. environmental protection statutes were first enacted in the late 1960's and 1970's. Many of these statutes, whose basic structure remains today, include enforcement provisions that enable the federal government to go to court to obtain injunctions against private polluters, to recover damages and civil and criminal penalties, and to put criminal violators of environmental laws in jail. A number of the statutes provide for enforcement at both federal and state levels. And many provide for private rights of action, or citizen actions to enforce environmental statutes against private and public entities. Among the most significant of the U.S. environmental statutes are the following:[2]

The Clean Air Act (CAA) provides for the adoption of uniform federal standards for specified air pollutants; places responsibility in the states for developing and implementing plans for attaining these standards, subject to federal plan approval; and requires controls on emissions from motor vehicles and new sources of pollution. The 1990 amendments to the Clean Air Act include regulation of substances that deplete the stratospheric ozone layer, as well as a tradeable emissions allowance program to control emissions of sulfur dioxide (SO_2), which is a key precursor of acid rain.

The Clean Water Act (CWA) establishes a detailed regulatory and enforcement program for discharges into U.S. surface waters from individual point sources employing a pollution discharge permit. The permitting program under the Clean Water Act implements two kinds of controls on pollutant discharges and effluent limitations and water quality standards. Effluent limitations for priority

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[2] The discussion of environmental issues in Part III, reviews in further detail, the application of a number of these laws and provisions.

pollutants are generally based on "best available technology" that is economically achievable to reduce discharges of specific pollutants from categories of point sources. Water Quality standards are developed by the states and measure the ambient levels of selected pollutants in the body of water receiving the discharge. The Clean Water Act also establishes a regulatory program to restrict discharges of dredged or fill material into U.S. waters, including wetlands.

The Ocean Dumping Ban Act (ODBA) implements U.S. obligations under the London Dumping Convention. It bans or restricts the dumping into ocean waters of all materials -- including sewage, industrial and medical wastes, dredged materials, munitions and radioactive wastes. The Act applies to all persons transporting such materials from the U.S.; it also applies to all material dumped within the U.S. territorial sea or in the U.S. contiguous zone and affecting the territorial sea.

The Safe Drinking Water Act (SDWA) establishes national standards of purity for drinking water applicable to any public water system that serves more than twenty-five people. Standards are based on specified permissible levels of contaminants, or on treatment techniques if the EPA determines that it is not economically or technologically feasible to ascertain the level of a contaminant. The act also regulates the underground injection of fluids in order to prevent the contamination of underground supplies of drinking water.

The Comprehensive Environmental Response, Compensation, and Liability Act ("Superfund", CERCLA) authorizes governmental cleanup of releases and threatened releases of hazardous substances, including abandoned hazardous waste sites. It also holds waste generators and transporters and site owners and operators liable for cleanup costs and for damages to natural resources, even where waste was left at sites prior to the enactment of the statute. The Act establishes a fund, financed primarily by taxes on petroleum products and chemical feedstocks, which can be used to underwrite the costs of cleanup; in the event a cleanup is financed by the fund, the government can seek to recover the costs from polluters. A related statute, the Emergency Planning and Community-Right-To-Know Act, makes public the magnitude of toxic emissions, and thus operates as a spur to industry to reduce those emissions faster than the law requires.

The Resource Conservation and Recovery Act (RCRA) provides for the control of various types of wastes.

For hazardous wastes, the Act establishes a cradle-to-grave regulatory program aimed at ensuring proper management, monitoring, and disposal. It also encourages proper management of municipal and non-hazardous solid waste through the establishment of federal criteria for environmentally sound solid waste management and the approval of state solid waste programs.[3] The Act regulates certain underground storage tanks, establishing performance standards for new tanks, and requiring leak detection, prevention, and corrective action. It also establishes a demonstration program for tracking medical waste from generation to disposal.

The Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA) regulates the development, sale, distribution, use, storage, and disposal of pesticides. Before a pesticide may be distributed or sold in the United States, it must be registered under this Act, which requires that a pesticide not cause "unreasonable adverse effects on the environment." The Act also provides authority for recordkeeping and inspection of facilities, penalties for violators, and export requirements.

The Toxic Substances Control Act (TSCA) provides authority for cradle-to-grave regulation of chemical substances and mixtures of chemical substances. Important components of the Act include authority to review new chemicals before they are manufactured or imported, require testing of existing chemicals, and prohibit or limit, on the basis of risk-benefit analyses, the manufacture or use of specific chemicals.

The Federal Food Drug and Cosmetic Act (FD&C ACT) includes a number of provisions aimed at ensuring the health protection of the U.S. population, including ensuring the safety and quality of the U.S. food supply through control of chemical contamination, monitoring of pesticide and other residues, and control of naturally occurring toxins and food sanitation. Many of these issues are closely related to environmental areas subject to environmental laws identified above.

The National Environmental Policy Act (NEPA) requires analysis of the environmental consequences of

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[3] Provisions aimed at prevention, detection and correction of leaks from underground storage tanks and establishing a demonstration medical waste tracking program were added during the 1980's. See 42 U.S.C. §§ 6991, 6992.

major federal agency actions. The Act requires each agency to prepare an environmental impact statement (EIS) before initiating any major federal action significantly affecting the quality of the human environment. It should also be noted that briefer documents, called Environmental Assessments, are prepared for many actions which do not trigger the need for EIS's. A draft EIS should include a statement of the environmental impact of the proposed action, any adverse effects that cannot be avoided should the proposal be implemented, alternatives to the proposed action, the relationship between short-term uses of the environment and its long-term productivity, and any irreversible commitment of resources involved in the proposed action. Draft EISs are circulated for interagency and public review and comment. A final EIS is then prepared and a Record of Decision is signed following circulation of the final EIS.

The Endangered Species Act (ESA) provides for environmental analysis of effects on endangered species, and imposes substantive requirements aimed at species preservation. It requires federal agencies to ensure that their actions are not likely to jeopardize any listed species, and prohibits the taking of listed species by private as well as public entities. In addition, portions of the statute implement the Convention on International Trade in Endangered Species (CITES) by banning trade in plant and animal species threatened with extinction, and regulating trade in species that may become threatened if not otherwise regulated.

Several U.S. laws aim specifically to protect fish and marine mammals, including whales, salmon, tuna, dolphins and sea turtles, and in some cases authorize the U.S. to impose unilateral trade sanctions against the products of countries with industries that violate the provisions of these laws. These laws include the Marine Mammal Protection Act of 1972, Pelly Amendment (Section 8 of the Fisherman's Protection Act of 1967), the Packwood-Magnuson Amendment of 1979, the Drift Net Impact Monitoring, Assessment and Control Act of 1987, and the Dolphin Protection Consumer Information Act.

The Magnuson Fishery Conservation and Management Act (MFCMA) establishes U.S. jurisdiction over all fishery resources in the U.S. Exclusive Economic Zone (EEZ), generally within 200 nautical miles of its coastline and its territories, and beyond that zone for anadromous species. This Act was enacted to ensure that fishing with the EEZ is conducted under sound scientifically-based management. Eight Regional

Fishery Management Councils are responsible for developing fishery management plans (FMPs) for domestic and foreign fishing in the U.S. EEZ. The Councils annually specify an optimum yield, a domestic annual harvest, and a total allowable level of foreign fishing (TALFF), if any, for each fishery under management within their jurisdiction. The plans may also specify species, gender, condition, size, gear, time, and/or area restrictions on fishing. Such restrictions may apply to all like product allowed into commerce within the United States. FMPs developed by the Councils are approved and implemented by Federal regulations. The Councils also evaluate estuarine and freshwater issues affecting managed species under their purview.

The coastal states are responsible for conserving and managing the commercial and recreational fisheries within their boundaries (generally, within 3 nautical miles of the U.S. coastline). The United States actively participates in international management efforts such as the International Convention for the Conservation of Atlantic Tunas (ICCAT), the Inter-American Tropical Tuna Commission (IATTC), the Pacific Halibut Commission, and others to conserve certain resources beyond the EEZ.

The Marine Mammal Protection Act (MMPA) establishes a national policy for protecting and conserving marine mammals by imposing a moratorium, with certain exceptions, on the domestic taking of marine mammals, or importing of marine mammals and marine mammal parts or products. The moratorium is administered by developing and implementing procedures to reduce the mortality of marine mammals during domestic and foreign commercial fishing operations, Outer Continental Shelf development, and other activities affecting these animals. In 1988, the MMPA was amended to require observer coverage on domestic fishing vessels in fisheries where a high level of interaction between the fishing operations and marine mammals is expected. The Act sets specific standards for the U.S. purse seine fleet's production of yellowfin tuna in the eastern tropical Pacific Ocean (ETPO) and requires (in order to export tuna to the United States) nations harvesting yellowfin tuna using purse seines in the ETPO (1) to have a regulatory program comparable to that of the United States, (2) to have a dolphin mortality rate for 1990 and thereafter no more than 1.25 times the U.S. rate, and (3) to meet other mortality standards for two specific species of dolphin.

Section 109 of Public Law 101-162 (Sea Turtle Conservation Law) provides that no shrimp harvested

with technology that may adversely affect sea turtles protected in the United States may be imported into the United States after May 1, 1991, unless the President certifies to the Congress by May 1, 1991, and annually thereafter, that the harvesting country has taken specific measures to protect those turtles.

The Pelly Amendment authorizes the Secretaries of Commerce and the Interior to certify to the President the fact that nationals of foreign countries are acting to diminish the effectiveness of an international fishery conservation agreement or CITES. After a country is certified, the President may impose limitations on the import of aquatic or wildlife products, depending on the basis of the certification, from such country. Other statutes, including the MMPA, also invoke the Pelly Amendment.

The Dolphin Protection Consumer Information Act provides standards for the voluntary labelling of tuna and tuna products as "dolphin safe" or other similar designation. It further imposes restrictions on the import of tuna and other fish products from countries whose nationals fish with large-scale high seas driftnets.

The Lacey Act authorizes the Federal Government to enforce the fish and wildlife laws of the states, and such laws of foreign Governments on its own nationals.

Other U.S. statutes with important environmental implications include the Coastal Zone Management Act, the Surface Mining Control and Reclamation Act, the Atomic Energy Act, other laws relating to conservation of wildlife and habitat, and various statutes relating to the protection or regulation of the public lands (e.g., the Wilderness Act, the Federal Land Policy and Management Act, the National Forest Management Act, the Wild and Scenic Rivers Act, laws establishing National Parks, and others).

States and local governments have also adopted a variety of their own environmental protection rules and requirements. In some cases, these rules are parallel to federal rules (e.g., "little NEPAs", state endangered species acts, etc.), or are adopted to implement federal standards or requirements (e.g., state programs to enforce the standards and requirements of RCRA). In other cases, states and local governments have adopted different, and in some cases more stringent, provisions where permitted by federal laws. For example, the air pollution rules/regulations of the state of California and its South Coast Air Quality Management District are in

some cases more strict than the federal standards. The federalism doctrine of preemption establishes some limits on the extent to which states may enact legislation which conflicts with federal rules.

ii. Institutional framework

The various federal laws and regulations noted above are administered by a variety of federal agencies. For example, the EPA administers (in whole or in part) the CAA, the CWA, the ODBA, the SDWA, CERCLA, RCRA, FIFRA and TSCA. The FD&C Act is administered by the Food and Drug Administration (FDA). In those areas of interrelationship with laws administered by EPA, the two agencies work in close cooperation to achieve coordinated regulatory goals and processes. The U.S. Army Corps of Engineers has lead responsibility for the Section 404 permit program of the CWA The U.S. Fish and Wildlife Service within the Department of the Interior and the National Marine Fisheries Service within the Department of Commerce administer the Endangered Species Act. The various public land laws and protections are administered by, among others, the National Forest Service, the National Park Service and the Bureau of Land Management. State and local authorities maintain their own agencies and offices to administer state and local laws. States are in some cases granted authority to implement federal law.

In addition, the courts play an important role in the review of legal issues and resolution of specific cases and controversies under these rules and authorities. See also Section I.C.

b. Laws of Mexico

The environmental laws and legal system of Mexico also provide a comprehensive framework for environmental protection, albeit within a markedly different constitutional and legal framework. In order to gain information concerning Mexican environmental laws, regulations and standards, a U.S. EPA Technical-Legal Mission met with SEDUE and other Mexican government officials in April 1991. A preliminary report with SEDUE input, was published following the visit. Publication of a full report awaits input from SEDUE. In addition, it is anticipated that a joint EPA/SEDUE publication, in English, of all regulations and standards enacted since the passage of the Mexican General Ecology Law (discussed below) will be completed in the near future.

The discussion below provides a general review of Mexico's system of laws, regulations and institutions to protect the environment (Provisions for enforcement are discussed separately in Section I.C., below).

i. The Framework of Substantive Rules

Mexico's legal system is a "civil law" system, as opposed to the common law system of the U.S. Accordingly, Mexico relies largely on administrative institutions and measures for interpreting and enforcing the law. In contrast, the U.S. legal system relies on judicial institutions and litigation (in addition to administrative regulation and review).

Mexico's legal environmental regime is comprised of laws, regulations and standards. The regime is implemented by a combination of federal, state and local government authorities acting in cooperation with one another.

The current basis of Mexico's environmental protection program is the 1988 General Law of Ecological Balance and Environmental Protection (General Ecology Law). The General Ecology Law is a wide-ranging law which addresses, in one piece of legislation, a range of environmental issues: air, water, and soil pollution; management of hazardous wastes and materials, pesticides and toxic substances; and conservation of wildlife, habitats and natural resources. The principal agency charged with implementation and enforcement of the General Ecology Law is the environmental sub-secretariat of SEDUE, established in 1982.

The Mexican environmental law includes, among other things, environmental impact reviews, health-based ambient standards and emission limits or technology-based controls on pollution releases. Mobile sources, while not well-regulated in the past, are becoming subject to emission limits and inspection and maintenance requirements resembling the U.S. program. Hazardous wastes are controlled through similar documentation requirements. Record-keeping, permitting and new source reviews are common elements of both the Mexican and U.S. systems. Where no standard exists for a given source, Mexican officials have developed their own standards, looking to U.S. and international regimes for guidance. Mexican law also provides for planning, enforcement and for limited public participation.

The legal regimes of the two countries differ somewhat in scope and each has provisions that may

reach beyond the other's system. For example, the U.S. restricts the land disposal of hazardous wastes, regulates underground storage tanks and provides for the cleanup of abandoned hazardous waste sites. Also, the procedures for public participation are much more developed in the U.S. than in Mexico. Mexico's regime, on the other hand, has requirements that the U.S. lacks: environmental impact reviews for private as well as public projects, risk analysis for certain types of new installations. The General Ecology Law explicitly refers to sustainable development as the guiding principle for decision-making.

Environmental Impact Review and Siting of New Sources. New sources or causes of "ecological imbalance" in Mexico, both public and private, must undergo an environmental impact review, comply with any promulgated technical standards and receive prior authorization before beginning operations. Mexico further requires a risk study if the new facility involves a "high risk" activity. To help conserve and protect its natural resources, Mexico's regime includes a type of national "ecological zoning" process through which geographic areas are defined and protected from certain kinds of development or use. This results in restrictions on where new projects may be located.

In covering private-sector activities, Mexico's environmental impact assessment system goes beyond U.S. law, which generally does not cover state, municipal or private activities. In addition, SEDUE has broad discretionary authority to impose and enforce environmentally protective conditions on new sources as part of its environmental impact review process.

Air Pollution. Mexico's air pollution program uses ambient, health-based criteria that are almost identical to the NAAQS (National Ambient Air Quality Standards) in the U.S. Mexico regulates stationary source air emissions through a system of emission limits, registration, new source review and technology-based controls. Mexico has in place a mobile source control program involving tailpipe emission limits, vehicle inspection and maintenance, fuel content specifications and transportation controls, and is further developing this program.

Currently, Mexico relies on the new source review process to address future hazardous emissions. SEDUE also has legal authority to adopt technical standards for these types of emissions, although it has not yet done so. Mexico's approach to chlorofluorocarbons (CFC) reductions (to protect stratospheric ozone) is

to seek voluntary agreements with industry. Mexico appears to be exceeding the schedule for such reductions for developing countries set forth in the Montreal Protocol.

Water Pollution. Mexico's water regime controls as many types of sources as in the U.S. Mexico limits effluents using a technology-based approach. It also provides for the setting of water quality standards and consideration of the assimilative capacity of a water body to determine specific limits for individual discharge points. Mexico uses registration and permitting programs to manage and control discharges and involves state and municipal governments in the development and enforcement of certain aspects of the water pollution control program.

Mexico's federal statutory requirements for water pollution control are broad, although problems may exist in implementation. For example, Mexico has not yet designated water quality criteria for the uses[4] of every stream segment in the country. Mexico may be using different criteria for changing the use designations for water bodies. Its regulation of toxic pollutant discharges remains minimal. Also, Mexican citizens have only a minor role in enforcing the water law. Mexico's water pollution regime is still in development, and thus far the emphasis has been on the elaboration of a basic regulatory system for municipal wastewater treatment.

Hazardous Wastes. Mexico uses a combination of characteristics, listing, and an extraction test to determine what is a hazardous waste. While the range of substances covered under Mexican law appears similar overall to that in the U.S., some of the individual chemicals covered by both are actually regulated more stringently by the Mexican program. Siting of disposal facilities is both more and less stringent in Mexico: more stringent with regard to

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[4] In the U.S. system for water pollution control under the Clean Water Act, the "use" of a water body refers to the activities which the body of water supports (e.g. swimming, boating, protection and propagation of aquatic life, industrial or agricultural purposes). Each use requires a different level of water quality, as defined by water quality criteria set out by EPA, which identify levels of pollutants which protect the relevant use. For example, water quality suitable for swimming must be much higher than that used for irrigation. If a water body is used for multiple purposes (which is normally the case) the most stringent criteria for each pollutant apply.

aquifer-connected zones, and less stringent with regard to flood and seismic zones. Mexico does not require the installation of a double liner underneath landfills, or impose closure or financial responsibility requirements on facilities. Currently authorized and operating disposal capacity in Mexico consists of only seven recycling and three disposal facilities.

Mexico requires generators to both register and file periodic reports on the volumes and types of wastes generated. The system of manifests and reporting for hazardous waste storage, transportation and disposal seems quite similar in both the U.S. and Mexico.

Mexico lacks an equivalent to the Superfund program, although it has established a voluntary fund for clean-ups.

Pesticides and Toxic Substances. In Mexico, pesticides, fertilizers and toxic substances are regulated through the Ecology Law, the Law on Plant and Animal Protection (1940, amended 1974) and the General Health Law.

Regulations cover the manufacture, formulation, packaging, labelling, use and disposal of such substances. Importation is prohibited if the product is banned in the country of manufacture or preparation. Pesticide and chemical products must be registered, and importers/exporters must obtain permits to allow trade. Mexico relies to a large extent on the health, safety and environmental data and risk analysis of the country of origin and of the international community.

The General Ecology Law gives the federal government authority over "high risk" industries, businesses and services which are so designated because of the chemicals they handle. These activities must be located in specially approved zones and submit accident prevention plans to SEDUE for approval. Mexico's law authorizes such extreme measures as seizures or shutdowns "when there exists an imminent threat to the ecological balance, or ... dangerous repercussions for the ecosystems, their components, or the public health ..." New high risk facilities must undergo a risk analysis as well as an environmental impact review before they can be built.

Over time, it is intended that the General Ecology Law will be augmented by environmental laws in each of the states of Mexico. At present, 18 of the 31 states in Mexico have promulgated such laws.

ii. Institutional Framework

SEDUE. At the federal level, the primary agency responsible for implementing the General Ecology Law, and EPA's counterpart, is SEDUE, established in 1982. SEDUE is the lead agency for coordinating federal, state and local government efforts to address environmental problems and development issues as they relate to the environment. SEDUE's environmental mandate under the General Ecology Law also includes conservation. SEDUE also has special duties relating to the Federal District's (Mexico City's) environmental problems.

SEDUE is organized into three sub-secretariats: Environment, Urban Development and Housing. The environment sub-secretariat, in turn, is organized into four units managing, respectively: (1) the formulation of guidelines, criteria, procedures and technical standards and the review of the environmental impact of new sources; (2) conservation; (3) issuance of regulations and enforcement; and (4) educational and citizen liaison programs.

Other Federal Agencies. SEDUE must coordinate and work closely with a number of other federal agencies and authorities to accomplish its environmental mission. The Secretaria de Agricultura y Recursos Hidraulicos (agriculture and water resources), or SARH is heavily involved with problems concerning agricultural products and practices and authorization for using the country's water resources. To address agricultural and toxic chemical issues, an interagency commission was created in 1987, called "CICOPLAFEST,"[5] in which SEDUE is a member along with three other ministries (see discussions above on Pesticides and Toxic Substances). The Secretariat of Commerce and Industrial Development (SECOFI), plays a significant role in regulating Mexico's maquiladora industries. The secretariat of health is involved in helping to set ambient standards. Also, national commissions on ecology, water, forestry and nuclear safety exist to help implement and coordinate these respective programs.

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[5] CICOPLAFEST stands for La Comision Intersecretarial para el Control del Proceso y Uso de Plaguicidas, Fertilizantes y Sustancias Toxicas, or the Intersecretarial Commission for the Control of the Processing and Use of Pesticides, Fertilizers and Toxic Substances.

State and Municipal Authorities. In addition to the federal institutions, state and municipal governments also hold significant responsibility for environmental protection. Although the General Ecology Law reserves certain issues for federal jurisdiction such as permitting of hazardous waste facilities, it assigns other issues to the Mexican states and municipalities. For example, states and municipalities are responsible for managing local water drainage and sewage treatment systems, with guidance and assistance by the federal government.

3. Relevant International Agreements Relating to Trade and Environmental Issues

There are several multilateral agreements which the United States and Mexico have signed that create obligations relating to international trade, conservation and environmental protection. Among the most important of these are: the Montreal Protocol on Substances that Deplete the Ozone Layer (1987), the Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal (1989), the Convention to Regulate International Trade in Endangered Species of Wild Fauna and Flora (CITES) (1973), and the General Agreement on Tariffs and Trade (GATT).[6]

Each of these agreements imposes an obligation on the signatory parties to control or prohibit from trade in certain products in order to further the environmental objectives of the agreement.

The Montreal Protocol on Substances that Deplete the Ozone Layer restricts the amount of certain ozone-depleting substances ("controlled substances") that a party can produce and consume. To encourage non-parties to join the agreement, the parties agree to ban the import of controlled substances from any state not party to the Protocol. Beginning on January 1, 1993, no "developing country" under Article 5 of the Protocol may export any controlled substance to any state not party to the Protocol. Furthermore, the parties are directed to "discourage" the export to non-parties of technology for producing and utilizing controlled substances. Finally, the Protocol states that the parties shall ultimately ban the import from non-parties of certain products containing controlled substances and consider banning or restricting

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[6] Mexico has signed and ratified all four of these agreements; the United States has signed but not yet ratified the Basel Convention.

the import of certain products produced with, but not containing, controlled substances.

The Basel Convention on the Transboundary Movement of Hazardous Wastes explicitly recognizes the sovereign right of each state to ban the entry or disposal of foreign hazardous wastes and other wastes in its territory. The parties agree to prohibit the export of hazardous wastes and other wastes to parties that have instituted such a ban. The parties agree not to permit hazardous wastes or other wastes to be exported to a non-party or imported from a non-party, absent a separate agreement which is consistent with the terms of the convention. Furthermore, the parties agree not to allow the export of hazardous wastes when they have reason to believe the wastes will not be managed in an environmentally sound manner. For those transboundary shipments that are allowed, the Convention establishes notification and consent requirements that must be fulfilled before shipment can occur. Finally, exporting states have a duty to take back hazardous wastes which for some reason cannot be disposed of in an environmentally sound manner in the importing country, as well as those that have been deemed illegal traffic.

The CITES Convention is intended to protect certain species of plants and animals from overexploitation. The Convention places restrictions on trade in specimens of species included in its three appendices. The first appendix includes those species threatened with extinction; these species may not be traded for commercial purposes and any other type of trade requires import and export permits from the shipping and receiving countries. The second appendix includes those species that may become endangered unless regulated; these species may be traded only if export permits are obtained. Such permits are to be issued only when issuance is consistent with the continued survival of the species. The third appendix includes those species an individual party identifies as being subject to regulation within its own jurisdiction and as requiring international cooperation to control trade. Export permits are required for these species if they are exported by a party that has chosen to list them in Appendix III.

The United States, Canada, and Mexico are each contracting parties to the General Agreement on Tariffs and Trade (GATT). The GATT sets forth the principles that govern the multilateral trading system. These principles include the principle of "most favored nation treatment" (insuring that a country does not discriminate in its trade in favor of the goods of one trading partner over the goods of another), "national treatment" (ensuring that imported goods received treatment no less favorable than the domestically produced like product), and "transparency" (ensuring in part that other countries are able to know what country has in place and how those measures operate).

Article XX of the GATT contains exceptions to these (and other) provisions of the GATT relevant to restrictions on trade imposed for the protection of human, animal, or plant life or health, or for certain conservation purposes. Article XX(b) authorizes contracting parties to take measures otherwise inconsistent with GATT principals, inter alia, that are "necessary to protect human, animal or plant life or health . . ." Article XX(g) authorizes otherwise inconsistent measures " . . . relating to the conservation of exhaustible natural resources if such measures are made effective in conjunction with restrictions on domestic production or consumption . . ." However, to qualify for Article XX exemptions, measures may not constitute " . . . a means of arbitrary or unjustifiable discrimination between countries . . . or a disguised restriction on international trade."

The GATT always provides a dispute mechanism for contracting parties in cases where one contracting party believes that another contracting party is not fulfilling its trade obligations under the GATT.

Concerns have been raised recently about how the GATT handles mixed questions of trade and the environment, particularly in the context of dispute resolution. The Administration believes the issues raised are serious and is pursuing ways to better integrate environmental considerations into the international trade system, for example through the recently revived GATT Working Group on the Environment and an OECD Joint Trade and Environment Experts Group.

B. INTEGRATED BORDER ENVIRONMENTAL PLAN

On November 27, 1990, the Presidents of Mexico and the United States met in Monterrey, Mexico and issued a joint communique emphasizing the need for ongoing cooperation between the two countries in the area of environmental protection. The joint communique " . . . instructed the authorities responsible for environmental affairs of their countries to prepare a comprehensive plan designed to periodically examine ways and means to reinforce border cooperation in this regard, based on the 1983 Bilateral Agreement."

The U.S. and Mexico are committed to the preparation of a comprehensive plan to protect the environment in the border area. Availability of the initial draft of the Border Plan for public review and comment was first announced in the Federal Register on August 14, 1991. In addition, public hearings in nine U.S. locations along the border as well as in seven Mexican locations across the border were held between September 16 and September 26,

1991. The Border Plan was revised in response to public comment and released February 25, 1992.

The underlying goal of the Border Plan is to provide for the long-term protection of human health and the environment within the border area. The Border Plan contemplates a multi-phase process to achieve this goal. In the first phase (1992-1994), several basic objectives are established including: (1) to strengthen enforcement of existing environmental protection laws; (2) to reduce pollution through new initiatives; (3) to increase cooperative planning, training and education; and (4) to improve understanding of the border area environment data collection, information exchange, and other methods. The Border Plan will again be reviewed and revised in 1994 and goals for a second phase established.

The Border Plan identifies a number of action items to be accomplished. These are described below.

1. Enforcement of Existing Laws

The Border Plan provides an action agenda to be taken up by the new Cooperative Enforcement Strategy Working Group. This Group will work to enhance enforcement capabilities to address border area environmental problems.

Specific focal points of the Cooperative Enforcement Strategy Working Group will include: information exchange relevant to transboundary pollution and related enforcement efforts; exploring the development of compatible computer software to facilitate such exchange of information; enhancing, through cross-border cooperation, enforcement capabilities at key border crossings to discover illegal shipments of hazardous wastes and other regulated materials; enhancing training efforts for inspectors and other enforcement personnel; facilitating personnel exchanges to share enforcement experiences and techniques; sharing of laboratory and other technical enforcement support services; and expanding cooperative interaction in the form of joint observer visits to facilities in each country's border area. Cooperative enforcement efforts are discussed in more detail in Section I.C.

2. Initiatives for Pollution Reduction

The Border Plan presents a number of initiatives which already have been announced, that will be undertaken to better address environmental issues and concerns in the border area. One initiative will be to increase wastewater treatment capacity at Nogales/Nogales (completion of expansion from 4.9 to 9 mgd), Nuevo Laredo/Laredo

(completion of 31 mgd system) and Tijuana/San Diego (substantial completion of 25 mgd system).

A second initiative will be to expand the industrial wastewater pretreatment program. This will center on pretreatment before hook-up to wastewater treatment systems, monitoring and characterizing effluent entering treatment facilities, and design of pollution prevention programs targeted at the most serious wastewater pollutants.

A third initiative, for which Texas and EPA appropriations have already been made, will provide water and sewer system construction in economically distressed communities in Texas, including colonias.

A fourth initiative will be to expand and improve drinking water systems. This initiative will involve an inventory of the sources, quality and treatment processes at existing drinking water facilities and a determination of priorities for drinking water needs.

A fifth initiative emphasizes pollution prevention. Under this initiative, the Border Plan will focus on implementation of a border area pollution prevention initiative modeled on EPA's 33/50 program.[7] The Border Plan will also provide: technical assistance for pollution prevention; training programs for the private sector; and model demonstration projects in local communities.

3. Cooperative Planning, Training, and Education

A third key objective of the first phase is to increase cooperative planning, training and education. With respect to emergency preparedness and response personnel, the Border Plan will seek to develop joint contingency plans in the major sister city pairs along the border; to foster local action groups to coordinate transborder planning, prevention and response; and to expedite transborder notifications and movement of emergency vehicles and personnel.

The Border Plan provides for expanded training of environmental enforcement personnel, improved safety and expedited movement of hazardous materials through border crossings, and the development of procedures for the

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[7] The 33/50 Program (sometimes called the Industrial Toxics Program) gets its name from its overall goals -- a 50% reduction by 1995 of emissions and off-site transfers of 17 high-priority toxic chemicals (mostly heavy metals and solvents) with an interim goal of a 33% reduction by 1992, using 1988 as a baseline year.

immediate return of illegal hazardous wastes to the country of origin. With respect to the private sector, the Border Plan will seek to develop education programs on waste-handling for commercial and industrial sources of waste and to publish a bilingual document on regulatory requirements for the transboundary movement of hazardous materials and waste.

The Border Plan provides for the development of bilingual environmental education materials to be distributed to local schools. It will also encourage the international exchange of teachers, and promote the development and distribution of bilingual public service messages.

4. Environmental Data Base

The first phase of the Border Plan also calls for improvement of environmental data bases. In particular, the Border Plan will seek to: develop a Border Area Toxics Release Inventory; develop a hazardous waste disposal inventory to assess current illegal disposal and projected future capacity needs for legal disposal; continue air quality monitoring, complete the emissions inventory, and develop a control strategy for the Ciudad Juarez/El Paso airshed; implement air quality programs and prepare emissions inventories and control strategies for the Tijuana/San Diego and Mexicali/Calexico airsheds; and compile an inventory of shared groundwater resources, assess future demands on those resources, and establish an area-wide monitoring program to define groundwater quality.

5. Funding Border Plan Initiatives

Both the United States and Mexico have set out increased spending plans for activities in support of the Integrated Border Environmental Plan. The U.S. plans to spend $143 million in 1992, which will increase to $241 million in 1993. This includes funding for wastewater treatment projects in Tijuana/San Diego, Nogales, Nuevo Laredo and New River which total $149.1 million in 1992-1993. It will also encompass $75 million in 1992-93 for drinking water supply and wastewater treatment for the colonias in Texas. During 1992-93, $22 million is planned to support EPA border programs, including an environmental enforcement initiative in the Border Area. Finally, U.S. funding for the International Boundary Waters commission (IBWC) for other than wastewater treatment construction includes $10.4 million in 1992, which will increase to $25.5 million in 1993.

Mexico has announced plans to spend $466.3 million in the Border Area in 1992-94, including funding for sewage

treatment ($220 million), solid waste disposal ($25 million), transportation and roads ($168 million), and development of housing separated from industrial areas ($4 million), with the remainder going for administration, cooperative enforcement and contingency funds. In addition, Mexico plans to spend $41 million in 1992-1995 for IBWC wastewater project construction, and will also make a total of $147 million available in 1992 to border area cities for environmental and infrastructure programs.

C. ENFORCEMENT OF ENVIRONMENTAL LAWS AND REGULATIONS

The discussion below provides a general review of enforcement policies and practices in the U.S.and Mexico[8], as well as joint or cooperative enforcement efforts of the two countries.

1. U.S. Enforcement Policies and Practices

U.S. environmental laws provide for a variety of enforcement tools to ensure compliance with environmental laws.

The Clean Air Act, for example, allows EPA to issue administrative compliance or penalty orders, bring civil actions or initiate criminal actions against violators, and impose sanctions such as injunctions, fines and imprisonment. Administrative penalties may range from field citations for minor violations, with fines up to $5,000 per day of violation, to orders with fines up to $25,000 per day of violation, to a maximum of $200,000. Court imposed civil fines may be assessed up to $25,000 per day for each violation without any maximum limit.

Similarly, the Clean Water Act (CWA), the Safe Drinking Water Act (SDWA), the Ocean Dumping Ban Act (ODBA), the federal Endangered Species Act (ESA), the Solid Waste Disposal Act (as amended by the Resource Conservation and Recovery Act (RCRA) and the Hazardous and Solid Waste Amendments (HSWA), and the Comprehensive Environmental Response, Conservation and Liability Act (CERCLA), establish administrative enforcement mechanisms such as compliance orders. These laws also provide for civil and

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[8] The discussion of Mexico's enforcement policies and practices is based on the U.S. government's understanding and interpretation of this system. It is anticipated that the government of Mexico will provide further and more complete information as to this enforcement system in Mexico's own environmental review document for the Free Trade Agreement (FTA), which Mexico is now undertaking to prepare.

criminal judicial actions and citizen suit provisions for injunction, and authorize civil/criminal actions in court[9], with the possibility of fine and/or imprisonment. CERCLA, for example, also explicitly promotes settlements with parties.[10] The statutes differ in respect to the amounts of fines authorized, the threshold for taking action and the timing of various actions.

The Federal Insecticide, Fungicide and Rodenticide Act (FIFRA) and the Toxic Substances Control Act (TSCA) operate somewhat differently than these other environmental statutes, as they regulate products and product usage. Like the other statutes, FIFRA and TSCA authorize civil and criminal penalties. In addition, however, they also authorize other types of enforcement actions. For example, FIFRA authorizes warning notices, "stop sale, use or removal" orders and product seizures. TSCA authorizes requiring public notice of the risk of injury, product replacement or repurchase and product seizures. The FD&C Act provides for action against violative products in the form of seizure or refusal of import, or for action against firms or individuals responsible for introducing violative goods into the U.S. market including injunctions, criminal charges, or in some cases civil penalties.

Most of these statutes, including the CAA, CWA, ODBA, CERCLA, RCRA, TSCA, and FIFRA are administered either in whole or in part by the EPA. The FD&C Act is administered by the Food and Drug Administration. The U.S. Fish and Wildlife Service (within the Department of the Interior) and the National Marine Fisheries Service (within the Department of Commerce) are responsible for enforcement of the ESA, and the U.S. Army Corps of Engineers generally has lead authority over the Section 404 permit program of the CWA (subject to EPA veto). The National Oceanic Atmospheric Administration (NOAA) administers the MMPA and other Acts for the protection of marine mammals. Jurisdiction over public lands, however, is vested under separate agencies and departments. For example, the National Forest Service (Department of Agriculture) has regulatory authority over National Forest Lands, the National Park Service (Department of the Interior) over

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[9] Actions for civil and/or criminal sanctions may be made in the courts. The Department of Justice is responsible for initiating criminal prosecutions.

[10] The Department of Justice is responsible for initiating civil infractactions and prosecutions in the Courts. Negotiated settlements are widely used in the United States. Approximately 95% of EPA's administrative and civil judicial actions are eventually concluded as negotiated settlements.

National Parks, and the Bureau of Land Management (BLM) (Department of Interior) over the large BLM land holdings.

Since 1988, EPA has referred 1,111 cases to the Department of Justice. During 1990, EPA established an all-time record for civil judicial enforcement by referring 375 cases to the Department of Justice. Also in 1990, EPA referred 65 criminal cases for violations of environmental laws to the Department of Justice.

U.S. enforcement efforts in recent years have focused increasingly on transboundary environmental concerns. For example, Congress amended RCRA in 1984 to prohibit the export of hazardous wastes to foreign countries unless notice was given to and consent obtained from the receiving country. In 1986, EPA promulgated regulations implementing this amendment, and the United States and Mexico signed Annex III of the 1983 Agreement on Cooperation for Protection and Improvement of the Environment in the Border Area. Annex III sets up procedures and bilateral obligations to ensure that hazardous wastes and substances do not cross between Mexico and the United States without notifying and obtaining the consent of the receiving country.

In its enforcement efforts on the transboundary movement of hazardous wastes, EPA works with the U.S. Customs and Department of Transportation to detect illegal shipments both from and into the United States. Working with Customs, DOT and local officials, EPA has developed substantial experience in conducting border surveillance activities to detect illegal movements of regulated material such as hazardous wastes. A number of high visibility border stops, for example, have provided EPA with an opportunity to work directly with U.S. Customs, and, in some cases, with Mexican officials.

In the U.S. system, states and local governments also play an extremely important role in enforcement of national environmental protection standards. As noted above, many federal standards delegate to states the principal responsibility for enforcement authority. In some cases, individual states may in turn delegate this authority to regional and/or local government authorities. In addition, the states and local agencies have principal enforcement authority over their own separately enacted sets of environmental protection rules and regulations. The border states of California, Arizona, New Mexico and Texas, for example, have strong enforcement programs for the statutes they administer. Nevertheless, EPA generally retains concurrent jurisdiction to enforce federal environmental laws, and Regions VI and IX often exercise that jurisdiction to assist or supplement the states' enforcement efforts.

Many U.S. federal laws directly authorize citizens to bring action against alleged violators (e.g., the Clean Air Act, the Clean Water Act, and others).

The mechanisms used to foster public participation generally include notification requirements, citizen suits, awards for information leading to a conviction or penalty, and opportunity to comment on consent orders and settlements. Record-keeping, reporting, monitoring, inspection, compliance certification and other information gathering activities are among the tools generally used to determine compliance. Other laws seek to ensure effective public access to this type of information (e.g., the Freedom of Information Act, the Government in the Sunshine Act). With the adoption in 1986 of the Emergency Planning and Community Right-to Know Act (EPCRA), the U.S. greatly expanded the information available to the public about emissions to the environment.

On the civil enforcement side, U.S. enforcement policy aims not only at making polluters pay, but also at taking the profit out of environmental violations, by imposing additional penalties as a deterrent, and seeking injunctions against harmful practices.

In sum, EPA, as well as a number of other federal, state and local agencies, have invested substantial energy in recent years into enforcement of environmental laws generally, and specifically as it relates to transboundary movements of wastes and other substances. These efforts put U.S., state and local environmental enforcement agencies in a position to address and mitigate possible negative impacts on the United States environment which may result if the NAFTA results in increased industrial activity in the border area.

2. Mexico Enforcement Policies and Practices

When comparing the U.S. and Mexican enforcement systems, it must be remembered that Mexico and the U.S. enact, develop, implement and enforce their laws, regulations and standards within fundamentally different legal systems and frameworks.[11] The United States has a

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[11] This discussion encompasses both U.S. and Mexican enforcement programs to help place them in context. The review of the Mexican program is based on understandings by U.S. officials developed through reviews of Mexico's environmental law and regulations and interviews with Mexican officials. This review is not meant to replace Mexico's own analysis of the impact of a potential free trade agreement on its environment.

common law tradition, built upon reliance upon an independent judiciary to interpret law and resolve disputes among adversaries. In the U.S., litigation in court plays a significant role in enforcement.

Mexico, on the other hand, has a civil law tradition which depends largely on administrative mechanisms and negotiation between parties to both settle disputes and enforce the law. This has resulted in greater relative power being vested in the executive governmental bodies to take unilateral actions, and greater use of administrative rather than judicial authority to achieve enforcement.

The General Ecology Law vests primary authority to enforce environmental laws, regulations and standards in SEDUE. In addition, as with U.S. law, the General Ecology Law delegates a significant role to the states of Mexico to adopt legislation and establish processes to implement the basic mandates of the General Ecology Law. As in the U.S., state environmental laws cannot require any lower standards than the federal law and in some cases are more stringent. By mid-1991, eighteen of the thirty-one Mexican states had enacted legislation comparable to the General Ecology Law including four of the states along the U.S.-Mexico border: Sonora, Nuevo Leon, Coahuila, and Tamaulipas.

Although Mexico's General Law on Ecological Balance and Environmental Protection only entered into force in March, 1988, and SEDUE has been hampered by budgetary constraints, Mexico has made remarkable strides in recent years in the development of an effective enforcement program. The infusion of additional funding, through the World Bank loan, as well as the recent commitment of a number of new enforcement inspectors (reportedly 50 for the Border Area and another 50 for Mexico City) will ensure that Mexico's enforcement program will become increasingly sophisticated.

At present, enforcement in Mexico under the General Ecology Law generally involves one of four techniques: plant closings (temporary, permanent, partial, or a combination thereof) intended to lead to the negotiation of settlement agreements; the imposition of fines; administrative detention; and voluntary compliance agreements. Mexico gives preference to these civil administrative enforcement tools over criminal prosecutions, which involve turning the matter over to the Attorney General's office. To date, criminal prosecutions on environmental matters have been rare.

Administrative proceedings in Mexico generally are argued by affidavit. A decision to close, or partially close, a facility rests principally with SEDUE. The emphasis on administrative measures highlights the importance of strict observance of formal procedures by

officials to ensure fairness in the process. If a company disagrees with the enforcement action and the SEDUE requirements for an acceptable plan, it can invoke an "amparo" proceeding and bring the matter to the Ministry of Justice. To date, this procedure has rarely been used.

In Mexico, plant closings are intended to lead to consultations between SEDUE and corporate entities, who are formally charged with violating environmental law. The closings occur in advance of negotiations, and the plant is allowed to reopen generally only after reaching an agreement with SEDUE which embodies a compliance schedule. The compliance plan or agreement may be tailored to take into account specific conditions and circumstances (e.g., size, capital availability, etc.). These legally enforceable agreements are monitored by SEDUE, to the extent resources permit.

Existing law permits the imposition of fines, indexed to inflation, up to the equivalent of U.S. $80,000. SEDUE's use of fines as an enforcement tool has been variable. In the early 1980's, SEDUE relied on fines as its primary enforcement approach. In mid-decade, however, SEDUE changed its strategy, becoming reluctant to use fines in the belief that available capital should be directed instead toward investment in pollution control equipment. SEDUE has indicated that it is reconsidering this strategy in light of its possible deterrent effect. SEDUE may also use charges to help pass along inspection costs to the regulated community.

Another enforcement tool that Mexico has used is administrative detention, which is not a criminal arrest but which can deprive a corporate officer of his or her freedom for up to 36 hours. More commonly, it is applied for several hours on a daily basis until agreement is reached on a compliance plan and schedule. Administrative detention is a useful enforcement tool in the border area for seizures of hazardous waste or cross border transportation of endangered species.

Mexican enforcement practice also seeks to perform on a multi-media (e.g., air, water, etc.) basis. In particular, inspections generally involve a review of impacts on various media at the same time. SEDUE's multimedia approach to inspections and enforcement actions, combined with its basic environmental statute makes the Mexican environmental system particularly amenable to accomplishing objectives of pollution prevention and waste minimization as enforceable requirements. The U.S. is now moving toward such a multi-media approach to inspections.

Mexican regulations recognize that one of the basic prerequisites to an effective enforcement program is the collection of information from the regulated community

adequate to identify regulated facilities, and to assess the nature and quantity of pollutants being generated and the management/pollution control practices of each facility. SEDUE has embarked on a program to collect such information, and is especially focussed on information regarding industries in the border area whose operations may have transboundary impacts.

In the past, SEDUE has lacked adequate resources to construct a fully-effective enforcement program. Nevertheless, SEDUE staff and management recently have undertaken significant efforts to exercise their enforcement authority and build an effective enforcement program, despite funding problems. These efforts are demonstrated, for example, by the recent closure of a large number of industrial plants and facilities, including the permanent closure of a large PEMEX facility near Mexico City, for failure to comply with environmental regulations and standards. These closings have encouraged substantial numbers of companies to approach SEDUE to negotiate voluntary compliance agreements; these too are monitored once they are finalized.

In addition, an increasing percentage of SEDUE's budget is being designated for enforcement and enhancement of inspection capabilities. The 1991 budget provides for an expenditure of the equivalent of $4.27 million on inspection, monitoring and enforcement activities. SEDUE also expects to receive approximately $45 million in World Bank funding, provided this amount is matched by the government of Mexico. A portion of these funds are designated for improved compliance monitoring and enforcement and for carrying out increased numbers of industrial inspections.

In fact, the number of inspections conducted in Mexico has been increasing since 1982. In the period 1982-1984, there were 1,209 inspections; from 1985-88, 3,525 inspections, with fines imposed on 179 plants; and from 1988-90, 5,405 inspections took place under the new law, with 3 permanent closings, 980 partial or temporary closings, 29 relocations, 1032 agreements negotiated for compliance scheduling and 679 voluntary compliance agreements.

	1982-84	1985-88	1988-90
Inspections	1,209	3,525	5,405
Enforcement Actions	Not Available	179 fines	3 permanent closings 980 partial or temporary closings 29 relocations 1,032 negotiated agreements for compliance scheduling 679 voluntary compliance agreements

Many of these actions have been taken along the border area. These facts are especially significant in light of the fact that until 1991 when 100 additional inspectors were being hired--50 for Mexico City and 50 for the border area--Mexico had only 109 inspectors, nine for Mexico City and 100 for the rest of the country.

The shut-down order is proving itself as a powerful enforcement tool, by bringing the violator to the negotiating table for developing a compliance plan on terms which give SEDUE a strong bargaining position.

To further these efforts, SEDUE is working to create a communications policy to increase the effectiveness of the enforcement program. By strategically publicizing its enforcement activities, SEDUE hopes to encourage wider voluntary compliance and increase the deterrent effect of its actions. This step should also help SEDUE respond in a concrete fashion to various interested constituencies. The air pollution problems in Mexico City have also contributed to a heightened awareness of the importance of environmental enforcement in one of the world's most populous cities.

These enhanced efforts at enforcement can be expected to play a critical role not only in addressing environmental concerns in Mexico, but also in minimizing or eliminating potential environmental impacts on the U.S. In the border area, for example, the use (or threat) of plant closings or administrative detentions could result in significant reductions in pollution emissions which end up in transboundary airsheds and water basins. Effective enforcement also will help to ensure that environmental and safety standards are met on the imports into the U.S. of foods and other products.

In sum, through SEDUE's recent efforts, Mexico has shown an increasingly strong commitment to the development of a sophisticated system for enforcing sound environmental laws. With continued infusions of additional funding and manpower resources, SEDUE's enforcement program will be well-situated to mitigate any negative domestic and transboundary environmental effects of increased industrial activity in Mexico.

3. Cooperative Enforcement Efforts

The United States and Mexico have been building a cooperative relationship with respect to environmental enforcement over the last several years. Cooperative enforcement efforts pursuant to the 1983 Border Area Agreement have focused in large part on hazardous waste enforcement issues. For example, EPA Region VI and IX officials have participated in a number of cooperative

efforts with SEDUE relating to hazardous waste enforcement, including inspector training activities, visits to Mexican and U.S. facilities, and participation in border stops to check for illegal hazardous waste shipments.

In addition, EPA and SEDUE have begun to develop a cooperative working relationship in taking enforcement responses to specific incidents. For example, after U.S., California and local investigators informed SEDUE that they believed they had discovered an illegal hazardous waste export operation, SEDUE discovered several drums of waste solvents at a pottery kiln in Tijuana. The drums were returned to the United States, with EPA assisting SEDUE in their removal. The incident led to the prosecution in the United States of the primary exporter, who has now been convicted of charges relating to illegal exporting. In another incident, SEDUE notified EPA that a U.S. owned facility had burned to the ground, with numerous hazardous waste drums left onsite. EPA investigators worked with SEDUE and the U.S. parent corporation to ensure that the drums were disposed properly.

Recently, EPA filed seven administrative enforcement actions against U.S. steel producers exporting electric furnace dust waste to Mexico in violation of U.S. hazardous waste export laws. These cases were developed with the cooperation of the Mexican government. These cases are part of a broader EPA effort to demonstrate the increasing priority EPA places on transboundary environmental problems. In September 1991 EPA filed more than 20 enforcement actions for compliance with four environmental statutes governing the import and export of hazardous waste and chemicals. Eight of these cases involved exports to Mexico. EPA's Region VI office in Dallas has also initiative four other cases enforcing regulations involving waste imports from maquiladora facilities in Mexico. EPA and the Mexican government will continue to cooperate to assure the enforcement of laws within their respective boundaries.

Against this backdrop, the recently created Cooperative Enforcement Working Group, noted above in Section B.1., will work toward increased cooperation. The working group will cooperate in case development, training, border checks, facilities visits, personnel exchanges, information exchange and development of data systems. The working group will focus available enforcement resources to achieve maximum deterrent effect. It will also encourage corporate managers to take a leadership role in meeting environmental protection standards.

Cooperative assistance in each country's enforcement efforts will be facilitated by two international agreements applicable to the sharing of evidence in enforcement cases and investigations. The Hague Convention on the Taking of

Evidence Abroad, to which both the United States and Mexico are parties, provides mechanisms for cooperative assistance in evidence-gathering in civil enforcement cases. The U.S./Mexico Mutual Legal Assistance Treaty provides analogous, but even more efficient mechanisms for such cooperative assistance in criminal enforcement cases. In addition to actual utilization of the procedures provided in these two agreements, the Cooperative Enforcement Working Group will be evaluating ways to build upon the concepts presented in these agreements to ensure the efficient and effective exchange of enforcement-related information.

Perhaps the greatest limitation on the role that cooperative, and indeed even unilateral, enforcement may have in mitigating negative environmental effects of increased economic activity, however, is resource constraints. While the precise nature and magnitude of the problem may vary as between the United States and Mexico, each country has limited funds and other resources which can be devoted to enforcement efforts. Only by ensuring adequate resources for enforcement, including cooperative enforcement efforts with respect to transboundary issues, can the mitigating effect of enforcement be assured.

D. TRAINING AND EDUCATION

Many of the cooperative efforts of the United States and Mexico have occurred in the area of training and education for government officials, the regulated community and the public at large. As mentioned in Section I.B., the 1983 Border Agreement embodies a significant commitment to cooperate on a variety of issues, including a range of joint training initiatives. Increased training and education also are among the key objectives of the U.S.-Mexico Border Plan, with cooperative efforts expected to be substantially improved and expanded in coming years. (See Section I.B.3.) To help educate the public at large, the Border Plan contemplates working projects with the public schools, civic groups, and the media; holding recycling workshops to help reduce the generation of solid waste; and the preparation of informational documents which can be widely distributed.

1. Enforcement Training

An important element of the education and training programs is to improve enforcement of the environmental laws of both countries. Several projects have already occurred, with significant participation by EPA regional offices. EPA officials from Region VI in Dallas, Texas, and Region IX in San Francisco, California, have sponsored several training efforts to date. For example, Region VI

sponsors an annual week-long RCRA Inspector Training course, and invites SEDUE participation. When the course was held in 1989, 19 SEDUE inspectors attended. The course will be held again in April, 1992. Similarly, with EPA Region IX participation, the University of California at Los Angeles (UCLA) and State of California environmental staff jointly conducted a two-week inspector training session in January 1990, which was attended by six SEDUE and six Mexican Health officials. A one-week follow-up course was held in Tijuana in May 1990 inspecting the maquiladoras.

EPA - Region VI and SEDUE also conduct regular joint "inspection/training" visits at border locations involving Mexican and U.S. facilities, on a monthly or bimonthly basis. Similarly, Region IX officials accompanied SEDUE officials to six maquiladoras in the vicinity of Tijuana, in addition to other, more regular joint visits to industrial sites in the border area. In January 1992, EPA Administrator William Reilly participated with Secretary Patricio Chirinos of SEDUE in a joint visit to maquiladora plants in Tijuana, Mexico, and held a working breakfast to discuss Mexico/U.S. environmental concerns in the Border Area.

Routine border stops, at times conducted jointly by EPA and SEDUE personnel, have been used as one of the mechanisms for training customs agents on safety procedures and transboundary regulations involving the shipment of hazardous wastes.

State and local officials and academic institutions in the U.S. have also contributed to the enforcement training of Mexican personnel. In addition to the UCLA training mentioned above, for example, officials from the California Department of Health Services and Los Angeles County accompanied SEDUE officials to 16 facilities on the U.S. side of the border. In September 1991, UCLA will sponsor a "Train the Trainer" course at which six SEDUE and six Mexican health officials are expected to attend; EPA has been invited to assist.

Cooperation to improve enforcement training is expected to grow over the next few years. Plans include expanding joint training visits on both sides of border; holding workshops, seminars, and field exercises; conducting personnel exchanges; and establishing regularized training programs for customs officials in the recognition and safe handling of hazardous waste shipments. In September, a 40-hour Health and Safety Training course will be held in San Luis Obispo, with six participant slots being held for U.S. Customs officials.

As discussed more fully above, one of the initiatives outlined by the Border Plan is a newly-created Cooperative

Enforcement Strategy Working Group, co-chaired by EPA and SEDUE officials and implemented under the 1983 Border Agreement, to identify and develop opportunities for improving cooperative enforcement efforts. The Working Group will address enforcement capacity building, that is, training and technology exchange to improve enforcement capability. Efforts will focus on methodologies for compliance evaluation and related enforcement activities. EPA will seek to make available to SEDUE, to the extent practicable, its U.S. laboratory facilities used for enforcement purposes. In addition, the work group hopes to facilitate personnel exchanges as a means of sharing experience and techniques.

The possibility of establishing cooperative training programs for regulatory staff on pesticides and toxic substances also is under discussion. The model for this effort would be an EPA training program at the University of California at Davis to which EPA invited Canadian staff. Other possibilities include training for inspectors, case development officers, and other types of enforcement personnel.

2. Emergency Response Training

As noted previously, the U.S. and Mexico established a Joint Response Team (JRT) in 1988, pursuant to the 1983 Border Agreement, to coordinate binational preparation and training for accidental releases or spills involving hazardous substances in the border area. The JRT sponsors training that includes simulation and field exercises that are open to federal, state and local officials from both sides of the border. Both the training and written materials are provided in both Spanish and English. The JRT has also held large annual conferences in 1989 and 1990 to improve planning and understanding of emergency response issues. The 1990 conference focused on developing sister city plans and joint response mechanisms. Additional workshops are being planned for 1992.

Among the joint exercises sponsored by the JRT are those that offer officials the opportunity to experience and respond to a simulated release. For example, in 1989 the JRT sponsored an exercise in Mexicali/Calexico, and more recently held full field exercises in Matamoros/ Brownsville, in December 1990, and at the San Diego/Tijuana border in September 1991. Other types of exercises include those that aim to improve cross-border and interagency communication in response to spills and other emergencies. Such a notification exercise in now being planned for the San Diego/Tijuana sister city area for early 1992.

3. Technical Program Training on Hazardous Wastes, Air Pollution, and Pollution Prevention

Over the past five years, a great deal of effort has been spent to help educate officials and the regulated community about proper management for hazardous wastes. Efforts have included about 30 joint site visits and conferences with significant participation by regulated industries. The last conference, held in November 1990, drew over 700 participants from the private sector. The fourth annual SEDUE-EPA Maquiladora Environmental Educational Conference was held in Ciudad Juarez in November 1991.

Besides the conferences and meetings, these efforts have resulted in a jointly-produced manual for the maquiladoras on the regulatory and technical requirements for managing hazardous wastes. The bilingual manual describes environmentally-protective waste management practices as well as the legal responsibilities of the facilities. The manual includes a discussion of the import and export requirements for hazardous waste shipments for both countries. The aim is to ensure that companies fully understand the effects and penalties of illegal waste handling and the alternatives to illegal dumping of hazardous wastes.

Since 1988, EPA and SEDUE have been engaged in a public education program, primarily targeted at maquiladora (in-bond) plants, to publicize U.S. and Mexican hazardous waste requirements. The program has focused on the regulation of transboundary shipments of hazardous wastes and the management of hazardous wastes generated in Mexico by the maquiladora industry. To date, the program has consisted of three annual informational meetings held in Tijuana, Mexico with over 2,000 in attendance since its inception.

EPA has provided SEDUE officials with training and technical assistance on hazardous waste incineration and other waste treatment techniques since 1987. In 1988 and 1989, EPA helped provide guidance on permitting a hazardous waste incineration facility being built in Tijuana. A cooperative training visit to commercial hazardous waste facilities is currently being arranged. SEDUE personnel have also attended various EPA-sponsored training courses in personnel protection and safety, treatment technology and handling during emergency response incidents.

Consistent with the purpose of Annex V, EPA Region VI personnel have been actively working with Mexican officials to improve capabilities to handle procedures and equipment used for monitoring ambient air quality. Region VI helped produce a cooperative Mexico-U.S. workshop in Juarez in Fiscal Year 1990 to assist government officials with

creating an inventory of air emissions, as required under Annex V.

Earlier, both EPA-Region VI and EPA-Region IX sponsored air pollution training courses that included SEDUE participation. In June 1985 Region VI devised and presented a basic ambient air monitoring course in El Paso to 30 U.S. and Mexican border engineers. Region VI also paid for EPA Air Pollution Training Institute (APTI) courses for SEDUE engineers, covering emissions inventories (May 1986) and quality assurance (April 1987); both were held in El Paso. In September 1989 Region VI and Texas Air Control Board Sponsored a two-week, intensive training session in air monitoring, quality assurance, and air pollution meteorology for two SEDUE engineers in Austin, Texas. In the 1986-1988 period EPA-Region IX funded APTI courses in quality assurance and air pollution management for SEDUE engineers.

EPA-Region VI is continuing this training by sponsoring courses in visible emissions inspection certification and combustion evaluation principles; these courses, taught in part by Texas Air Control Board personnel, were held in Saltillo, Nuevo Leon, Mexico in September 1991.

Finally, in September 1989 EPA's Office of Air Quality Planning and Standards (OAQPS) devised and presented a two-week orientation to approximately 30 SEDUE staff on U.S. air pollution control principles.

Another program area in which the U.S. and Mexico have cooperatively engaged in training efforts is pollution prevention. To maximize the effectiveness of pollution prevention efforts, EPA and SEDUE are jointly planning a technical assistance program for businesses that choose to participate. The program will include information resources and university-based technical resource centers, as well as training. The training will teach industry employees how to conduct environmental audits and assessments and how to identify alternative production processes and materials that will minimize waste generation. Another training program will target wastewater treatment plant operators and focus on ways to minimize energy and water use.

To provide informational resources, the program will make available information to businesses through university-based research and education centers. To be located in the border area, these centers will conduct research on pollution prevention techniques applicable to particular border industries. They will also help businesses apply the information contained in the international data bases.

E. CONSERVATION

The United States and Mexico have a long history of cooperating on wildlife protection and the conservation of natural resources. By virtue of their long common border and the migration patterns of many species, both countries have a common interest in a great number of wildlife and natural resource issues. The entire border region, and in particular the Rio Grande valley, has a great deal of unique biological diversity which the two sides are taking steps to protect. Major areas of cooperation include wildlife conservation, national parks and forests, and marine resources.

1. Wildlife Conservation

Cooperative efforts to protect wildlife date back to the Convention for the Protection of Migratory Birds and Game Mammals, signed by the U.S. and Mexico in 1936. Under this agreement, the two countries work together in conducting on-the-ground surveys and management activities for the protection of migratory species. In 1941, the U.S. and Mexico joined with other countries in signing the Convention on Nature Protection and Wildlife Preservation in the Western Hemisphere. Several major Convention activities that serve the entire Latin American region are located in Mexico.

More recently, in 1984 the U.S. Fish and Wildlife Service (FWS) and SEDUE signed an Agreement for Cooperation in the Conservation of Wildlife. Under this agreement, a U.S.-Mexico Joint Committee on Wildlife Conservation was established to serve as the joint coordinating body for bilateral efforts in such areas as the conservation of threatened or endangered species of wild flora and fauna; exchange of wildlife specimens; and management of migratory birds. Cooperative arrangements under this agreement have included:

- the training of Mexican technicians in systems of wetlands management;
- establishment of a system to exchange information on the trade in wildlife and to cooperate in preventing illegal and unauthorized wildlife trade;
- bilateral programs for monitoring migratory birds and protecting such species as northern Mexican endangered cacti, bighorn sheep, wild turkey, and the golden eagle.

The United States has also undertaken a significant effort to train Mexican officials in the procedures

employed by the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES). Mexico's recent accession to the treaty marks an important step in efforts to address the illegal trade in wildlife and will be an area for continued work between the two countries. Drawing in part on this cooperative work, SEDUE has built up considerable experience in dealing with international wildlife trade matters and has established an accounting system that should be easily adapted to conform with CITES requirements. We anticipate that, with Mexico now a full member of CITES, current programs to address the trade in wildlife can be strengthened and enhanced.

Important conservation work is also conducted under the U.S.-Mexico-Canada Tripartite Agreement on the Conservation of Wetlands, signed in March 1988. This agreement provides for cooperation in preserving wetlands that support migratory birds throughout North America. Pursuant to this agreement, the FWS carries out projects in Mexico under the North American Wetlands Conservation Act, which provides significant levels of funding for wetlands projects in all three countries. Work is underway with Mexico to identify wetlands and wintering sites for migratory birds considered priority areas for trilateral cooperation.

2. Conservation and Management of Parks and Forests

In 1988 the National Park Service (NPS) and SEDUE signed a cooperative agreement on Cooperation in Management and Protection of National Parks and Other Protected Natural and Cultural Heritage Sites. National parks are particularly important in the border area and comprise some 18 percent of the land on the U.S. side. Cooperation in this area is increasing and the NPS has recently set up a Mexico Coordination Office in Las Cruces, New Mexico.

Under the cooperative agreement, NPS and SEDUE have agreed to 14 joint projects including studies on the black bear and endangered peregrine falcon; advanced training in fire management techniques; wildland fire management in tropical forests; the management and operation of protected areas; basic management and operation of protected areas in tropical regions; and environmental education/ interpretation for teachers and protected area managers. Protection of endangered species is a top priority area for cooperation. For example, in the Sierra del Carmen and Big Bend region, NPS is providing technical support in a study of the habitat and migration patterns of the black bear, which is listed in Texas as a state endangered species.

U.S. and Mexican officials have also been discussing the possible creation of counterpart parks along the border. The NPS and SEDUE are discussing the establishment

of a protected area adjacent to Big Bend National Park that would include the Sierra del Carmen. SEDUE plans to develop the park in Mexico primarily for the protection of the fragile Chihuahuan desert environment. Another proposal is being considered for the establishment of a Greater Sonoran Desert Biosphere Reserve that could include such areas as Organ Pipe National Monument, Cabeza Prieta Game Refuge, Tohono O'Dam Reservation and Pinacate Reserve. Workshops have been proposed to bring the principle planning and land management agencies together to discuss regional cooperation for protection of these resources.

The U.S. Forest Service has had a cooperative agreement with Mexico's Forest Service since 1985. Joint projects include firefighter training, cooperative research on insects and pest control, protecting migratory bird habitats, and remote sensing inventories of Mexico's forests. Technical assistance efforts include training in techniques for inventorying forest resources and producing maps of existing forested areas throughout Mexico based on satellite data. Cooperative work is also done under the auspices of the Food and Agriculture Organization's North American Forestry Commission (NAFC), which involves the United States, Mexico, and Canada.

The U.S. Agency for International Development (AID) is also very active in forest and park programs being implemented under its 1990-1993 environmental and global climate change action program. One of the three major goals of the AID global climate change program is to provide support for the protection and sustained management of priority parks and reserves, and the buffer zones surrounding these areas, in Mexico's national system of protected areas. The management of natural areas and the establishment of improved land use in the buffer zones around these areas provide direct benefits in terms of species and habitat protection and sustainable development. AID support includes:

- The Mexico component of the Nature Conservancy's Parks-in-Peril project, under which up to $2 million will be provided over three years to protect seven of Mexico's most important (and most threatened) wildlands;

- A debt-for-nature swap involving up to $1 million in support to Conservation International for the management of the Selvan Lacandona and Montes Azules biosphere reserves;

- An estimated $3.7 million grant to the World Wildlife Fund to support buffer zone management around priority parks and reserves, focusing on the tropical and sub-tropical areas of southern Mexico;

- The Northern Border Wildlands Project, a $160,000 grant to the World Wildlife Fund to support a pilot project involving cross-border cooperation on parks/buffer zone management;

- Funding through the World Wildlife Fund and other groups for coastal parks and reserves, including Sian Ka'an, Rias Celestun/Lagartos, La Encrucijada, and Calakmul.

3. Conservation of Marine Resources

The United States and Mexico have an extensive relationship in the area of fisheries and marine resources in the Gulf of Mexico and the Pacific Ocean. At the technical level, U.S. and Mexican scientists have worked together for years on issues of mutual interest and concern, including the exchange of data and information on a variety of shared resources on both coasts through two long-standing cooperative scientific programs. At the policy level, different, and at times conflicting, goals and priorities in the fisheries sector have highlighted the importance of effective and open communication between policy makers.

Among the most important issues between the two countries are the incidental capture of dolphins and sea turtles in the tuna and shrimp fisheries, respectively. The United States has perhaps the world's strictest measures for protecting dolphins and other marine mammals and bans the importation of tuna harvested in a manner harmful to dolphins unless countries meet these strict standards. Mexico was unable to meet these standards for the 1990 fishing season and, as a result, imports of most tuna from Mexico has been banned since February 22, 1991.

Nonetheless, Mexico has made progress in this area. Between 1986 and 1989, the number of dolphins killed-per-set in the Mexican tuna fleet decreased 58 percent, with further significant reductions in 1990 and the first half of 1991. Although the embargo remains in place, the U.S. and Mexico have agreed to continue to work together to seek a solution and to manage the situation in the most constructive way possible.

With regard to the protection of sea turtles, U.S. shrimp vessels are required to use turtle excluder devices (TEDs) in areas where sea turtles are likely to be taken. Mexican officials have stated that they will implement a program to reduce sea turtle mortality in the commercial shrimp fishery comparable to that in the United States, including the use of TEDs, within three years. U.S. and Mexican technicians have worked together both in the Pacific and in the Gulf of Mexico to train Mexican gear

specialists in the construction, installation, and use of TEDs in the Mexican shrimp fleet. These efforts have been funded by a two-year AID funded project under the auspices of the Technological Institute of Monterrey.

In addition, President Salinas announced in May 1990 that Mexico would end its commercial harvest of the endangered olive ridley sea turtle; a traditional fishery that employed some 400 families along the Pacific coast of southern Mexico. This commitment was acknowledged internationally as a major step in protecting this species.

Both countries worked to have the Gulf of Mexico designated as a specially protected area under Annex V to the Convention for the Prevention of Pollution from Ships (MARPOL). This designation will require stringent restrictions on the generation and disposal of wastes resulting from the normal operation of ships in the Gulf of Mexico. In addition, under the 1980 Agreement of Cooperation Regarding Pollution of the Marine Environment by Discharges of Hydrocarbons and Other Hazardous Substances, the two countries have established contingency plans to address oil spills and other related marine emergencies in shared waters.

Both countries were also active in recent regional efforts to reach agreement on a Specially Protected Areas of Wildlife (SPAW) Protocol to the Cartagena Convention. Under this Protocol, signed in January 1990, the Caribbean region countries have agreed to cooperate in identifying and protecting ecosystems and species that may be at risk. The SPAW Protocol provides an important mechanism for addressing areas of concern, including endangered species and such fragile ecosystems as coral reefs, sea grasses, and mangroves. Both the U.S. and Mexico are parties to the Convention for the Protection and Development of the Marine Environment of the Wider Caribbean Region and Protocol (the "Cartagena Convention") which entered into force in 1986. It requires both parties to promote contingency plans for combatting oil pollution.

There is extensive cooperation in the area of research on living marine resources. Although there are no cooperative management programs in place for shared fishery stocks, the two countries work together to exchange information and data on stocks of mutual interest under two bilateral agreements, the MEXUS Gulf and MEXUS Pacifico. The MEXUS Gulf program includes work on sea turtles, coastal pelagic species, shrimp, demersals, sport species, and plankton, while the Pacific program has focused on sardines, anchovies, marine mammals, shark, billfish, and sport species. Other issues under discussion include the ecological impacts of the introduction and transfer of aquatic organisms into the Gulf of Mexico and Caribbean Sea

and the exchange of information on technical programs for seafood inspection.

F. DEBT AND THE ENVIRONMENT

Debt-for-nature swaps are providing a significant opportunity to channel additional resources into protecting Mexico's environment. Through the work of a range of environmental organizations over the last five years, debt-for-nature swaps have made an important contribution to conservation and environmental protection efforts in Latin America. Several U.S. environmental groups are actively pursuing the possibility of debt-for-nature swaps with the Government of Mexico.

The Inter-American Development Bank (IDB) is supporting efforts to protect Mexico's environment through debt-for-nature swaps. The IDB Board recently approved allowing countries to use environmental project loans to purchase commercial bank debt, on a case-by-case basis, as a complement to their other environmental programs (discussed below). Mexico is likely to be the first country to benefit under this facility, by using up to $100 million in environmental project loans to purchase commercial bank debt. In return, Mexico would commit local currency for a major reforestation project around Mexico City.

The Administration has proposed legislation under the Enterprise for the Americas Initiative (EAI) to facilitate debt swaps in qualifying Latin American countries by selling or canceling a portion of Export-Import Bank loans and Commodity Credit Corporation (CCC) assets acquired through CCC's export credit guarantee programs. Countries would need to qualify for debt reduction under the EAI and would then negotiate a swap transaction with private parties, including the amount of local currency to be committed to particular projects. Treasury would act on the basis of a certification from the country of the debt swap agreement and on receipt of payment for the Eximbank loans or CCC assets.

This program could generate substantial resources for environmental protection and conservation in Mexico, if Congress provides the necessary authority and appropriations. Mexico owes about $1.2 billion to the Export-Import Bank and about $415 million to CCC; it is anticipated that 10 to 20 percent of such loans and assets could be available for debt swaps if Mexico meets the policy criteria of the EAI program.

G. MULTILATERAL DEVELOPMENT BANK ACTIVITY

The World Bank and the Inter-American Development Bank have been active across the spectrum of economic sectors in Mexico over a period of many years. Cumulative lending to Mexico from these two institutions now amounts to more than $20 billion. In the past several years, both of the banks have begun to place greater emphasis on environmental considerations, seeking to mitigate adverse environmental effects of on-going lending programs and to promote new types of lending designed to have beneficial effects on the environment. This greater emphasis on environmental considerations is a result of U.S. policy initiatives.

Both of the banks recently adopted new procedures for categorizing all projects on the basis of anticipated environmental effects. They have also taken steps to assure that environmental impact assessments are completed for those projects that will have a significant effect on the environment.

In the World Bank, specific lending to Mexico already approved for environmental purposes includes a pilot project for solid waste management and a sector loan for water supply and sanitation programs. The solid waste management loan, amounting to $25 million, was approved in fiscal year 1986. The water supply and sanitation sector loan amounted to $300 million and was approved in fiscal year 1991.

Environmental elements of other projects approved by the World Bank have involved pollution control sub-projects in industrial re-lending, protection and preservation of archeological sites, and monitoring of environmental effects associated with forestry activities. In addition, two studies have been completed on thermal power plant pollution control and the environmental aspects of electric power transmission lines and substations.

Currently under preparation within the World Bank is a $400 million project for transport air quality management in the metropolitan area of Mexico City. Other projects also under preparation include approximately $45 million in World Bank assistance, this amount to be matched by the Mexican government to help strengthen environmental policies and institutional capability and $5-10 million for an ozone layer protection program. It is expected that these three projects will be approved during fiscal year 1992. One element of the environmental policy loan is to be funded through the Global Environment Facility. The ozone layer protection project is to be financed through the Multilateral Fund of the Montreal Protocol.

In its most recent fiscal year, the Inter-American Development Bank provided $350 million for a water supply

and sewerage project in Monterrey and $450,000 for an environmental assessment study of a forest development project in Oaxaca and Guerrero. Environmental elements were also included in investment programs for the electric power sector and the transportation sector.

The Inter-American Development Bank is currently preparing a project for ecological conservation programs in the metropolitan area of Mexico. This loan amounts to $100 million and is expected to reach the Board before the end of 1991. A second project for forest development in the states of Oaxaca and Guerrero is also under preparation and expected to be approved later this year. This loan amounts to $50 million and includes provision for a forest preservation and protection element that is being built into the design of the project.

II. ELEMENTS OF A NORTH AMERICAN FREE TRADE AGREEMENT

In order to assess the possible environmental effects of a NAFTA, it is necessary first to describe the likely shape of such an agreement. The trilateral negotiations on a NAFTA are at an intermediate stage, with disagreements among the two parties across the range of issues under negotiation.

The following description, therefore, is a necessarily general description of the evolving agreement under negotiation, which retains the simplifying assumptions used in the first draft of this Review. It is not a U.S. negotiating position or proposal for the negotiations.

A. GATT REQUIREMENTS FOR FREE TRADE AREAS

Under the terms of a free trade agreement, countries agree to provide preferential duty treatment for imports from the other parties to the agreement, but do not harmonize their external tariffs for the rest of the world. It represents a departure from the fundamental principle of nondiscriminatory, "most-favored-nation" (MFN) treatment that members of the GATT have agreed to accord each other. The GATT anticipates such agreements may be entered into among its members but sets tight conditions on the terms, to limit the possibility of trade-diverting, special preferential arrangements on a sectoral or partial basis.

The requirements for a free trade area are set forth in GATT Article XXIV. (Many of the same requirements also apply to a customs union, where the members agree to a common external tariff. The European Community is a customs union.) These include:

- The agreement must cover substantially all trade.

- The agreement must provide for elimination of duties among its members, on a fixed and "reasonable" timetable.

- The duties and other regulations of commerce maintained by the parties to the free trade agreement (FTA) with respect to non-participants in the FTA shall not be higher or more restrictive than they were prior to the formation of the free trade area.

The U.S., Mexico and Canada have agreed that any NAFTA negotiated among the three countries will be fully consistent with GATT requirements and will be presented to the GATT Contracting Parties as has been past practice

(both the U.S.-Canada FTA and the U.S.-Israel FTA were presented to GATT).

B. NEGOTIATING PROCESS TO DATE

Negotiations began June 12, 1991 with a trilateral meeting of trade ministers in Toronto, Canada. The ministers decided that the negotiations should be broken into six broad areas: market access, trade rules, investment, services, intellectual property rights, and dispute settlement. Under these headings the three countries have to date established 19 working groups to negotiate agreement positions.

At Toronto, the trade ministers underscored their determination to take all the time necessary to negotiate a good agreement. They also set as a rule that nothing in the negotiation would be finally agreed until everything in the negotiation was agreed.

During the summer months, the working groups began the work of exchanging information and laying out the issues. Officials from all three countries have been meeting at the working level for preliminary discussions. The work has been monitored in the first instance by the chief negotiators. In the U.S. case, the chief negotiator is the Deputy U.S. Trade Representative, Ambassador Julius Katz.

The chief negotiators have held six plenary sessions, one in Washington on July 8 and 9, 1991, in Oaxtepec, Mexico, on August 6 and 7, 1991; in Ottawa, Canada on October 9 and 10, 1991; in Washington, D.C. January 16 and 17, 1992; in Aylmer, Canada February 4-5, 1992; and in Dallas, Texas February 17-21, 1992. The plenary sessions have been used to review progress in negotiating groups and deal with difficult and/or cross-cutting policy issues.

As agreed in Toronto, a second trilateral ministerial meeting was held in Seattle on August 18-20, 1991. At that meeting, the early progress to date was assessed. Subsequent ministerial level meetings were held in Zacatecas, Mexico October 25-26, 1991, and Chantilly, Virginia February 9-10, 1992. At their meetings, Ministers have discussed the progress of the negotiations and parallel discussions of labor and environmental issues, and provided political guidance to chief negotiators.

Throughout the negotiating process, the Administration has been meeting regularly with Congressional and private sector advisers, in order to help determine what market opening measures are most important to obtain from the Mexican side, and what are the most sensitive sectors or policies that either should be outside of the scope of

NAFTA disciplines, or should be staged in over the longest period possible.

Each of the three sides began tabling proposed agreement chapters in November. By the end of the year, each country had tabled texts for most of the substantive chapters of the agreement. In mid December, President Bush and President Salinas met at Camp David and agreed that they both would like to complete the agreement in 1992, if that could be done. As an interim goal, the Presidents directed the negotiating teams to put the three sides proposals together as a composite, bracketed text to facilitate further negotiations. This task was completed by the end of January.

As of mid February, 1992, the negotiating groups are meeting to continue the negotiating process. Some brackets have been removed, and overall a constructive spirit has been evident. While there are still many brackets large and small, the negotiations are proceeding satisfactorily. The Administration cannot forecast when negotiations may be completed. As the President promised Congress on May 1, 1991, we will take all the time necessary to conclude agreements in which both the Congress and the Administration can take pride.

C. POSSIBLE FINAL FORM OF THE NAFTA

In its May 1 "Response to Congress on Issues Raised in Connection with the Negotiation of a North American Free Trade Agreement," the Administration made a number of firm commitments concerning the negotiation of a NAFTA. These include:

- To avoid dislocations to industries that are import-sensitive, tariffs and non-tariff barriers on such products will be eliminated in small increments over a time period sufficient to ensure orderly adjustment.

- The Administration is prepared to consider transition periods in excess of those provided in the U.S.-Canada FTA (i.e., 10 years).

- The agreement will provide effective safeguard procedures to prevent injury from increases in imports that will provide a procedure for temporary reimpositions of duties and other restrictions.

- Strict rules of origin will ensure that the benefits of a NAFTA do not flow to pass-through operations exporting third country products to the U.S. with only minimal assembly in Mexico.

Such rules of origin will impose clear, tough and predictable standards.

- The U.S. will maintain the right to exclude any products that do not meet its health or safety requirements and the U.S. will continue to enforce these requirements.

- The U.S. will maintain its right to impose stringent pesticide, energy conservation, toxic waste and health and safety standards.

- The U.S. will maintain its rights, consistent with other international obligations, to limit trade in products controlled by international treaties.

In addition to the above points, based on the statements of the three parties concerning the negotiations, it seems reasonable to assume that the final form of the NAFTA will include these elements:

- It will phase-out duties on all products traded between the three countries, with final elimination of all duties to take at least a decade.

- The agreement will provide for fair and non-discriminatory treatment to investors of one of the member countries investing in the other.

- The agreement will substantially liberalize conditions of entry and provide for non-discriminatory treatment for the provision of services.

- The agreement will provide for minimum standards of treatment for intellectual property.

- The agreement will provide dispute settlement mechanisms for the settlement of disputes concerning its terms and obligations.

By trilateral agreement, the NAFTA will not cover immigration, with the possible exception of a narrow provision facilitating temporary entry of certain professionals and managers.

D. FORECASTED MACROECONOMIC EFFECTS

Trade liberalization has been a major factor contributing to the unprecedented growth of the U.S. and global economies during the past four decades. Global tariff averages have fallen from 40 to 4 percent since

1947. These past barrier reductions have greatly stimulated the expansion of trade. This rapid trade expansion, in turn, has encouraged investment, employment, technological development, and economic growth in the United States and abroad. The purpose of the NAFTA negotiations is to craft an agreement that will allow the three countries -- the United States, Canada, and Mexico -- to realize the economic gains from further trade liberalization, as well as to build a stronger economic and political relationship for the decades ahead.

The three major economic studies outlined in the Administration's May 1 Response to Congress, and several other studies completed since then, suggest that negotiating a free trade agreement (FTA) with Mexico to form a NAFTA will produce net economic benefits for all three countries, with the magnitude of both the economic benefits and possible dislocation associated with a NAFTA reflected in each country's relative size and its existing level of trade barriers.

Together, these studies paint a picture of expanding trade and increased income for the three countries as a result of a NAFTA. Generally, they imply that the largest economic benefits from a NAFTA would accrue to Mexico, with the United States and Canada each gaining but to a lesser degree.

From the perspective of its effect on the U.S. economy, these studies all reach the same broad conclusions with regard to the impact of negotiating a free trade agreement (FTA) with Mexico to form a NAFTA.

First, the formation of an FTA with Mexico would generate small but positive overall economic benefits to the U.S. economy, with the level of U.S. Gross Domestic Product estimated to be as much as 0.5 percent higher once a NAFTA is fully implemented than it would be in the absence of a NAFTA. The finding of economic benefits accruing from reciprocal trade liberalization is in line with the gains from such liberalization that the United States has enjoyed in the past. Moreover, Mexico is entering the negotiations from a position of greater trade protection than the United States. For example, over half of the U.S. imports from Mexico already enter duty-free. Mexico will thus be reducing its trade barriers by a greater amount to achieve an FTA with the United States. This adds to the economic benefits accruing to the United States from an FTA with Mexico.

Second, U.S. farmers and manufacturers would benefit from free trade with Mexico. This finding is largely attributable to the fact that Mexican barriers to imports in these sectors are particularly high. Eliminating these barriers would have a relatively great impact on the

ability of U.S. producers in these sectors to penetrate the Mexican market, thereby expanding U.S. output and employment in these sectors to a relatively great degree.

Third, dislocation associated with the formation of an FTA with Mexico would be minimal, even in those sectors which are most affected. This conclusion reflects the fact that the U.S. economy is 25 times the size of the Mexican economy, that U.S. barriers to imports from Mexico are already quite low, and that remaining U.S. trade barriers would be phased out gradually in the NAFTA over a number of years. Together these factors suggest that liberalization of the remaining U.S. barriers to Mexican imports will not cause major dislocation in the U.S. economy.

In addition to the studies released after the completion of the Administration's May 1 Response which corroborate the Administration's views, several studies have also been released which reach different conclusions regarding the likely impact on the U.S. economy of the formation of an FTA with Mexico. These different conclusions stem largely from alternative assumptions about how investment in Mexico would change as a result of a NAFTA, and the fraction of any increased Mexican investment which might displace investment in the United States. Nevertheless, most studies of the economic impact of a NAFTA corroborate the views expressed in the Administration's May 1 response.

III. ENVIRONMENTAL ISSUES RELEVANT TO A NAFTA

A. ALTERNATIVE BORDER GROWTH SCENARIOS

It is as yet uncertain what form a final NAFTA will take. Nevertheless, an important factor in assessing the border environmental effects of a NAFTA is the degree to which a NAFTA affects the rate of investment and economic growth at the border. Consequently, to assess the border environmental effects of a NAFTA it is necessary to first characterize the likely economic effects of a NAFTA on the border region.

Forecasting future investment and economic growth at the border under a NAFTA is fraught with difficulties. The NAFTA impact studies mentioned in Chapter II present estimates of the broad economic impact of a NAFTA on each country as a whole, but none of these models has the capability to directly estimate regional or sub-regional effects. In an effort to provide some quantitative basis for assessing the likely environmental effects of a NAFTA on the border region, while at the same time acknowledging the difficulties involved in quantifying these effects with any precision, we therefore develop a number of alternative scenarios, linking them where possible to existing modeling results.

It is important to keep in mind, however, that in quantifying these growth effects, there are several important additional effects of a NAFTA on environmental conditions at the border which are not captured solely by a focus on growth.

First, a number of economic studies have projected that a NAFTA will have a large positive effect on Mexican income. Such an increase in income will allow Mexico to devote more resources to enforcing its comprehensive environmental law. Mexico's environmental law, enacted in 1988, is inspired largely by U.S. law and experience. The Mexican government has made clear that improving enforcement is the next key step. The increased resources made available by a NAFTA, in enhancing the Mexican Government's ability to enforce its environmental law, will help to ameliorate the environmental problems at the border. This is a potential effect of the NAFTA which could be quite significant.

Second, the close relations between the United States and Mexico fostered by a NAFTA are likely to be conducive to continued and enhanced cooperation in dealing with our common border environmental concerns. The alternative in which a NAFTA is not established would likely portend less cooperative environmental relations between our two

countries, and a less adequate solution to those border environmental issues that do arise.

In attempting to quantify the impact of a NAFTA on border economic activity, it is useful to begin with a discussion of why firms choose to locate in the border region. Throughout the past several decades, most of the growth in Mexican manufacturing has come through the maquiladora program, which grants special trade status to firms that export the bulk of their production. While originally set up to operate only in the border region, since the early 1970's the maquiladora program has granted special trade status, with few exceptions, to companies located anywhere in Mexico. Thus, at least since the 1970s, the central reason for locating on the border has not been to qualify for maquiladora status per se, but rather to achieve proximity to the U.S. market. That is, firms that locate production along the Mexico border do so primarily to facilitate the import of U.S. components and the export of finished goods into the United States.

A Baseline Scenario Without NAFTA

From its beginning in 1965 with 12 plants employing about 3,000 workers, the maquiladora sector has expanded dramatically, especially since 1982. Over the decade from 1980 to 1989 the number of border maquiladora workers increased at an average annual rate of over 12%, the number of maquiladora border plants grew at an average annual rate of over 9%. According to a study by the Department of Labor, this rapid growth was encouraged by "brisk development of industrial parks along the northern frontier of the country [Mexico], the sustained growth in the U.S. economy, the abundant supply of low-wage Mexican workers, and the steady devaluation of the peso vis-a-vis the U.S. dollar." By 1989, there were 1,665 maquiladora plants in Mexico overall, and 1,327 in the border zone (see Table 1).

Recent years have seen more and more of these businesses choosing to locate in the interior rather than the border, with the proportion of plants at the border falling to 80 percent from over 90 percent a decade ago. Nevertheless, border growth continues to be strong, at least through 1989, the most recent year for which data are available. During 1986-89, the number of border maquiladora workers increased at an average annual rate of 17 percent while the number of border plants grew at an annual rate of 20 percent.

A number of factors combine to make it extremely difficult to predict with any accuracy the future growth in maquiladora activity over the next 10 years on the basis of

Table 1. U.S.-Mexico Border Growth: Number of Workers and Plants in the Mexican Maquiladora Sector Border Cities annual average and percent of national total (1975, 1980-1990 and estimates for 1991).

	Workers (thousands) level,	% of Total	Plants level,	% of Total
1975	62	92	418	92
1980	107	89	551	89
1981	116	89	533	88
1982	113	89	514	88
1983	135	89	533	89
1984	177	89	595	89
1985	186	88	672	88
1986	212	85	770	86
1987	251	82	926	82
1988	299	81	1140	82
1989	340	79	1327	80
1990	354 est	77 est	1492 est	77 est
1991	342 est	77 est	1439 est	77 est

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est = estimate

Source: "Worker Rights in Export Processing Zones: Mexico," U.S. Dept. of Labor, Bureau of International Affairs, August 1990, with 1988-91 updated estimates from "Maquiladora Survey" INEGI (Mexican statistical agency), July 1991.

Notes: 1991 estimates are based on reported national data through April only. 1990-91 border share of national totals developed from American Embassy, Mexico cable number 25165, September 1990.

the past. Output of the border industries is linked closely to overall U.S. economic performance. Moreover, part of the past surge in the growth of the border industries occurred during a time of substantial restructuring by U.S. firms that resulted in the out-sourcing of labor-intensive operations to the Mexican maquiladora sector. In addition, despite their desire to remain near the U.S. market and maintain their border operations, some maquiladora operators have more recently begun to feel pressure to move their operations to the interior where labor costs and turnover are lower and the supply of workers is more abundant. It is virtually impossible to assess with any accuracy how these various forces are likely to play out over the coming decade.

For this reason, it is prudent to include a wide range of plausible growth rates in the baseline scenario. While border growth is likely to slow somewhat from its pace of the 1980s, it is difficult to predict just how much slower it is likely to be over the next 10 years. We therefore assume that baseline border growth over the next 10 years could lie in a range between 5 and 15 percent annually.

Alternative Scenarios: Scenario 1

In attempting to quantify the effects of a NAFTA on border economic activity, a natural anchor is provided by the available modeling predictions concerning the impact of a NAFTA on the growth in bilateral exports from Mexico to the United States. That is, increases in Mexican exports to the United States triggered by a NAFTA are likely to translate into increased border activity associated with a NAFTA.

Of course, not all exports from Mexico to the United States are produced at the border. In fact, at present, between 35 and 45 percent of Mexican exports to the United States originate from the border area. However, under the assumption that the regional distribution of production facilities in Mexico for use in exporting to the United States remains unchanged under a NAFTA, the additional growth along the Mexican border generated by a NAFTA can be approximated by estimates of the additional growth in Mexican exports to the United States brought about by a NAFTA.

Available modeling estimates put the additional growth in Mexican exports to the United States that would occur as a result of a NAFTA, when spread evenly over 10 years, at between 1 and 2 percentage points per year. Thus, scenario 1 puts the additional continued growth along the U.S.-Mexico border that might arise as a result of a NAFTA at between 1 and 2 percentage points per year over the next 10 years. Combined with a baseline of 5 to 15 percentage

point annual growth in the region, the with-NAFTA border growth under scenario 1 could lie within a range of 6 to 17 percent per year over the next 10 years.

Scenario 2

However, scenario 1 ignores an important change that will be brought about by the NAFTA. Specifically, while a successful NAFTA would likely increase the incentives to invest throughout Mexico, the NAFTA should disproportionately favor a move toward investing in the interior of the country, thereby diminishing any increase in environmental strain on the border which might arise from a boom in Mexican economic activity. This undercuts a key simplifying assumption of scenario 1, namely, the assumption that the regional distribution of production facilities in Mexico for use in exporting to the United States will remain unchanged under a NAFTA, with 35 to 45 percent of Mexican exports to the United States continuing to originate from the Mexican border after the NAFTA.

Historically, companies that have taken advantage of the maquiladora program have been restricted by law in their ability to sell to the domestic Mexican market. Also, Mexican and U.S. tariff provisions create incentives to maximize the use of foreign components in maquila output. Consequently, under the maquiladora program, an artificially high proportion of foreign investment in Mexico is there to serve the U.S. market. The artificially high proportion of maquila sales to the U.S. market has led, in turn, to an artificially high incentive to locate at the border. Thus, despite the opportunity to locate in the interior of Mexico under the maquiladora program since the early 1970's, firms have had little incentive to do so.

A NAFTA which provides national treatment for U.S. corporations and subsidiaries operating in Mexico with regard to foreign trade, investment, and full duty-free access to the Mexican market for the output of such plants will alter these incentives. By eliminating restrictions on serving the Mexican market and disincentives to the purchase of Mexican inputs, the NAFTA will make investment in the interior relatively more attractive, and much of any new investment in Mexico under the NAFTA will reflect these changing incentives. A NAFTA would permit plants operating in Mexico to produce for both markets. It would therefore likely shift the optimal plant location for any firm seeking to operate in Mexico farther south.

This effect should be reinforced by the growing pressures already being felt by maquiladora operators to move their operations into the interior where labor turnover rates are much lower and congestion is much less of a problem. Indeed, while historically over 90 percent

of maquiladora activity was located at the border, this figure has dropped to 80 percent most recently, as these pressures are beginning to be felt.

In this regard, the U.S. Embassy in Mexico City has noted the potential for economic development just beyond the 100 km border area but still within the northern border states: in Hermosillo, Sonora; Monterrey, Nuevo Leon; Ciudad Chihuahua, Chihuahua; and Saltillo, Coahuila. More dramatic moves to non-border states are also possible if the numerous large U.S. firms that now have headquarters in Mexico City build on their experience with the interior and begin locating new facilities closer to Mexico City, Guadalajara, and Monterrey, the heart of the Mexican market. Finally, while it may take some time to develop the transportation infrastructure necessary to support increased investment in the interior, it should be recognized that investment decisions are "forward-looking", i.e., based on expectations of the future. If a firm wishes to build a new plant to take advantage of a NAFTA and faces a temporarily inadequate infrastructure in the interior, it has an incentive to delay construction rather than to build on the border.

While quantifying the degree to which a NAFTA will shift regional investment patterns away from the border is difficult, it is likely that this effect will have a larger impact on economic activity at the border than the effects considered in scenario 1. If this change in incentive is sufficient to alter the location of even a quarter of the new border investment predicted over the next 10 years under scenario 1 away from the border and toward the interior, the with-NAFTA border growth under scenario 2 will lie within a range of 4 to 13 percent per year over the next 10 years.

B. OVERVIEW OF POTENTIAL ENVIRONMENTAL IMPACTS

1. Potential Impacts of the NAFTA

The proposed NAFTA has the potential to create or contribute to a number of environmental impacts, both adverse and beneficial. The discussion below highlights several key potential concerns that have been raised about the potential environmental effects of a NAFTA, which are reviewed in further detail in the remaining sections of Chapter III.

Impacts of Growth/Development. As noted above, a free trade agreement may prompt substantially increased investment and economic growth in Mexico, both within and outside the border area. There is concern that any increased growth and development that may occur in the border area would place additional strain on existing

infrastructure and environmental protection capacities in the border area sister cities, which share aquifers, river waters and air basins.[12]

Principal specific areas of concern in the event of scenario 1 are the potential impacts on air and water quality, water supply, disposal of solid and hazardous wastes, noise, risk of accident and wildlife/habitat conservation. For example, to the extent border area growth results in the discharge of larger amounts of untreated sewage into shared rivers, there could be an increase in levels of water (and ocean) contamination as well as the incidence of certain water-borne diseases in the border area. Such growth could also contribute to an increase in air emissions, and improper disposal of hazardous substances on land or in waterways. Increased development could place additional burdens on already short water supplies, and impinge on free-flowing waters with adverse effects on wildlife and habitat. To the extent that increased use of underground water lowers the water table, highly saline surface waters also would be more likely to enter and contaminate these waters.

On the other hand, as noted above, the NAFTA will increase the economic incentives that may reinforce the tendency of investors to "turn inwards" in Mexico, rather than focus investment along the border. Under this scenario, environmental problems in the border area may diminish considerably over time, as development (and its related impacts) is shifted and "spreads out" to other parts of Mexico.

However, while "decentralization" of investment away from the U.S.-Mexico border area to the interior of Mexico under a NAFTA may over time reduce the overall strain on the border environment because of the interior's more developed infrastructure, it is also possible that relocation of firms and investment to Mexico's interior may not represent a net reduction in pollution for either Mexico or the United States.

For Mexico, the environmental impact of any new investment depends on the technology and pollution abatement techniques used, and the follow-up program of inspection and enforcement. That is why Mexico's environmental impact review requirement described in Section I.A.2 above is so important.

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[12] As noted above, it is not possible to forecast reliably the extent of the increase in border area growths that may result from a NAFTA. See Section III A, above (reviewing alternative growth scenarios).

For the U.S., moreover, even industry located outside the immediate border area can have an impact on our territory. For example, air pollution from cities outside of the border area, such as Monterrey, Mexico (120 kilometers from the U.S.-Mexico border), has been shown to affect visibility in U.S. national parks located in the border region, and land-based pollution from the interior of both the United States and Mexico has a demonstrated impact upon quality of shared water ways such as the Gulf of Mexico and upon the global commons.

The negotiation of the NAFTA is likely to be an important stimulus to maintain high levels of cooperation and commitment to address such problems. Moreover, in the longer term, the economic benefits that Mexico is expected to realize from trade liberalization could be of critical importance in support of its ability to address these and other existing or future problems. As noted above, Mexico already has adopted strong and comprehensive environmental protection laws; however, a principal remaining challenge is to generate adequate resources to fully implement and enforce these laws. The NAFTA would be one of the most effective ways to generate the economic growth needed to achieve this objective.

Product Safety. There is concern that without adequate provisions, liberalized trade under the NAFTA may result in an increase in imports into the U.S. of products subject to health and environmental safety standards less strict than those which apply within the U.S. The Administration is committed, however, to maintain the right to exclude any product not meeting U.S. health or safety requirements, and to prevent any relaxation of U.S. product health and safety standards as a result of the NAFTA.

Hazardous Waste Disposal. There is concern that hazardous wastes now required to be returned to the U.S. pursuant to Mexican law would likely remain in Mexico if the special tariff status of maquiladora operations are phased out. This could lead to a relative increase in disposal of hazardous waste in the border area on the Mexican side, which might possibly create transboundary impacts within the U.S. unless Mexico rapidly develops increased capacity to safely handle and dispose of hazardous wastes. Trade liberalization in the services area brought about by the NAFTA, however, should make environmental technologies for waste treatment more available and affordable in Mexico. Removal of trade barriers to the introduction of such technology should be a goal of the NAFTA negotiations.

Transport/Risk of Accident. There is concern that the NAFTA could result in increased cross-border transportation of hazardous products, heightening the risks of environmental accidents. At the same time, however, trade

liberalization in services may reduce existing cross-border transfer requirements, and the risks inherent in such transfers.

Concern also exists that increased ground transport to accommodate NAFTA-generated trade activities would increase vehicle emissions in the border area.

Conservation and Protection of Biodiversity. The potential liberalization of trade in natural resource products and in transnational investment activities under the proposed NAFTA could alter and increase the rate at which natural resources and ecologically diverse and important areas along the border area are used, consumed and/or depleted, unless steps are taken to ensure that any new activities or investments stimulated by the NAFTA are undertaken in an environmentally sustainable manner. Particular concern has been expressed over potential impacts of increased trade and investment activities on Mexico's tropical forests and the biodiversity they support, as well as over energy development (e.g., oil pollution in the Gulf of Mexico) and other resource extractions. Accordingly, it is important that the NAFTA protect the right of the U.S. and Mexico to impose trade restrictions pursuant to U.S. environmental, conservation and endangered species legislation and agreements.

On the other hand, a reduction of barriers to natural gas exports to Mexico, to investments in cogeneration, and to environmentally sound products and technologies, may promote more sustainable investment practices and activities with positive effects on the Mexican environment and, through transboundary impacts, the U.S. environment.

Creation of "Pollution Havens". It has been suggested that expanded free trade would create incentives and increased opportunities for industry to relocate to jurisdictions having less stringent pollution control standards. Little evidence, however, supports the conclusion that any major relocation would occur. See Section III.D, "Investment Flows," below.

Impacts on Agriculture and Industrial Production Practices. It has been suggested that the competitive forces unleashed by a NAFTA might negatively affect the ability of Mexico to achieve sustainable agricultural practices, and could result in a more energy and capital-intensive form of farming. On the other hand, free trade and agriculture could lead each nation to pursue its comparative advantages in agriculture and in particular take agriculturally marginal lands out of grain production.

Since precise effects of a NAFTA on agricultural practices in Mexico critically depend on Mexican governmental policies in this sensitive sector, it is

expected the Mexican government will address this issue in its forthcoming environmental review.

There is also concern that enhanced competition may increase incentives for less efficient industries to take "shortcuts" with environmental compliance requirements, in order to reduce costs and remain competitive. On the other side, however, it has been observed that many industries recognize the advantages of adopting environmentally sound production practices (selling to the "green market"; avoiding high long-term clean up or retrofit costs). Enhanced international competition may strengthen incentives to adopt such practices.

Undermining of Domestic or International Standards. Concern has also been expressed that the free trade obligations of a NAFTA might be used as a basis to undercut U.S. domestic environmental standards and/or rights and obligations under multilateral environmental agreements to which the U.S. is a party.

In response, the U.S. is committed to maintain the rights of local, state and national governments to maintain the right, jointly or severally, in reliance upon available scientific evidence and in accordance with the level of risk considered acceptable by the nation in question to: ensure the integrity of their domestic regulatory system and processes; achieve higher levels of environmental protection than may be afforded by the development of internationally or regionally established standards; and take measures to address transboundary, regional and global environmental problems.

2. Potential Environmental Impacts of the No NAFTA Alternative

A number of serious environmental issues and problems already have arisen in the context of existing U.S.-Mexico trade, in particular the maquiladora program which allows the rapid pace of industrialization, population and urbanization in the sister cities of the border area. As noted above, absent a NAFTA, border area growth is expected to continue at the rate of 5 to 15% annually. These data suggest that with or without a NAFTA, there are environmental concerns in the border area that merit priority attention.

To the extent the NAFTA would result in a "turn-inward" of investment, it may be predicted that border area growth, and related environmental impacts, would - over time - be higher without a NAFTA than with a NAFTA. By contrast, to the extent the NAFTA would result in a "border surge", the no-NAFTA alternative may - at least in the

short-term - result in less border area environmental stress than the NAFTA.

The longer term economic and environmental benefits made possible by the NAFTA, of course (noted above), would not be present under the no-NAFTA alternative. The NAFTA also may stimulate even higher levels of cooperation and commitment to address common environmental problems than would occur under the no-NAFTA alternative, and may offer a unique opportunity to explore technology transfer issues and to develop creative solutions to these problems. Indeed, in the absence of a NAFTA, Mexico may have less incentive to fully develop and enforce its environmental legal and regulatory regime in respect, for example, to U.S. concerns related to transboundary impacts.

3. Policy/Program Options and Recommendations to Reduce Adverse Impacts

This Review identifies a number of Policy and Program Options and Recommendations to reduce or avoid any potential adverse impacts which may be generated by the NAFTA. These include: specific provisions within the proposed NAFTA to address environmental concerns related to trade of goods and services; and efforts, which are not part of the NAFTA, but which will proceed on a parallel track (including joint initiatives) to address border area environmental problems and improve environmental cooperation among the U.S. and Mexico, as described in Chapter I (e.g., the Integrated Border Plan, etc.). The parallel track activities are scheduled to occur whether or not a NAFTA is adopted; nevertheless, to the extent the NAFTA creates closer relations between the U.S. and Mexico, it may further bolster efforts to implement fully these parallel track activities.

Proposed Policy/Program Options and Recommendations to NAFTA negotiators are discussed in detail in the remaining sections of Chapter III.

C. ENVIRONMENTAL IMPACTS ON THE BORDER REGION

1. The Border Area Environment[13]

The United States and Mexico are separated by a political boundary which stretches nearly 2,000 miles between the Pacific Ocean and the Gulf of Mexico. For approximately half of this distance, the boundary follows the beds of the Colorado and Rio Grande (known in Mexico as the Rio Bravo) rivers. For the other half, the boundary is not related to any topographical features, and is marked by monuments, markers and by signs at the formal border crossings.

The climate and physical features of the land are similar on either side of the border. With the exception of fifty miles of border along the Rio Grande next to the Gulf of Mexico, the border generally traverses high-altitude deserts populated by drought resistant species of plants and animals. In these areas, day-time temperatures can be hot in any season of the year, while night-time temperatures may drop to near freezing. Average annual rainfall is approximately 11 inches.

From an ecological and environmental perspective, the border area is undivided. Several rivers, including the Santa Cruz, Rio Grande, San Pedro, Colorado, and New Rivers, flow along transboundary paths. Three major desert regions (the Sonora, Mohave, and Chihuahua Deserts), with their unique ecosystems, fall on both sides of the border. Groundwater aquifers which provide essential water supply for both individual human uses and commercial activities straddle the border. The several "sister cities" (see below) which face each other along the border share the same drainage basins and the same airsheds.

Most of the 250,000 square mile border area is sparsely populated. Yet, nearly 5 million people inhabit the area. This population is not evenly distributed. Over 90% of the total population of the border area lives in the eight sister cities of Tijuana/San Diego, Mexicali/ Calexico, Nogales/Nogales, Ciudad Juarez/El Paso, Nuevo Laredo/ Laredo, Matamoros/Brownsville, McAllen/Reynosa, Eagle Pass/Piedros Negras, Del Rio/Ciudad Acona and Yuma/San Luis Colorado. Tijuana/San Diego alone have a combined population of nearly two and one-half million,

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[13] The term "border area" as used herein has the same meaning as that term when used in the "Integrated Environmental Plan for the Mexican-U.S. Border Area (First Stage, 1992-1994)" (the "Border Plan"), and generally refers to the area within 100 kilometers on either side of the border. See the Border Plan.

Ciudad Juarez/El Paso have over one million, and six other sister cities have a combined population of over 200,000.

Historically, the economy of the border area has been dominated by mining and agriculture. The area is rich in copper, gold, silver, lead, manganese and phosphate. Despite the low annual rainfall, the land continues to support cattle and sheep ranches and farms producing wheat, fodder crops, maize and millet. In more fertile areas, widespread irrigation supports the production (and processing) of large quantities of fruits and vegetables destined for both U.S. and Mexican markets.

In 1965, the Mexican government established a border industrialization plan to attract labor intensive industries to Mexico, and enacted the so-called "maquiladora law". Since that time, the economy of the border area has become more industrialized. Under the maquiladora law, industries based outside Mexico are permitted to bring capital equipment, components, and raw materials into Mexico without paying import duties. The finished products of these Mexico-based industries, or "maquiladoras", then are exported to foreign markets, with duties owed only on the value added in Mexico. In return, hazardous waste produced at the maquiladoras, not otherwise disposed of in accordance with Mexican law, must be returned to the original country of export.

Between 1965 and 1989, over 1,600 maquiladora plants employing over 400,000 people have been established in Mexico.[14] About 80% of these maquiladora plants (1,327) are located in the border area, employing approximately 360,000 people. These workers, and their dependents, account for a significant percentage of the population along the border. Most of the remaining maquiladora plants are located in and around Mexico City. Approximately 80% of the border maquiladoras are located in six Mexican sister cities.

On the U.S. side of the border area, EPA data indicates that in 1989 there were 145 manufacturing facilities which process toxic chemicals (25,000 pounds or more per year) or use toxic chemicals (10,000 pounds or more per year) and employ 10 or more employees.

In general, the overall economy of the border area (on either side) is intertwined. Thousands of people travel across the border each day between their homes and their jobs. In fact, nearly 200 million people cross this border

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[14] In 1965, there were twelve maquiladora plants in the border area, employing 3,000 people. In 1980, there were nearly six hundred plants employing over one hundred thousand people.

each year, making it the most frequently crossed border in the world. Many border area residents speak both Spanish and English.

2. Air Quality

a. Issue

Whether or not the North American Free Trade Agreement (NAFTA) becomes reality, there will be continued increases in industrialization of the U.S.-Mexico border region. Undoubtedly there will be additional stress placed upon the border's air quality. The obvious, related issue to be addressed in any environmental analysis of the NAFTA is the extent to which border air quality in the U.S. will be affected by its implementation.

Such an air quality analysis must not only address the perceived industrial, commercial, residential, and population changes, but it must also project what concomitant air pollution emission changes will occur despite increasingly efficient pollution control technologies and enhanced U.S.-Mexico technical coordination.

b. Background

Border air quality presents a curious dichotomy. On the one hand, the vast portion of the U.S.-Mexico border area is a lightly populated, rural desert or semi-desert. In fact, because of the lack of significant population and industrial/commercial bases, EPA does not require air monitoring in many such rural areas. Air quality in these areas is probably quite good usually; frequent dust storms are a natural occurrence, however, aggravated by wind erosion from agriculturally disturbed lands.

On the other hand, in the larger border "sister cities" poor air quality is a reality. The EPA considers any area that fails to meet its National Ambient Air Quality Standard (NAAQS) for any of six "criteria pollutants" to be "nonattainment"; the area must then work with the concerned State's agencies and EPA to devise a plan to attain the NAAQS. Table 2a illustrates air quality levels from the two largest U.S. border cities, San Diego and El Paso. Due to dust entrainment and some industrial influence, portions of six other border counties, whose land areas are largely rural, are also at nonattainment levels. Table 2b illustrates this.

Visibility, an air quality value not strictly related to human health, is another concern in the border region. The U.S. National Park Service maintains a visibility

TABLE 2a

RECENT AIR QUALITY LEVELS IN TWO MAJOR U.S. BORDER METROPOLITAN AREAS
(1989 Values, Unless Otherwise Specified)

Area	PM-10*		SO_2*		CO* (ppm)	NO_2 (ppm)	O_3** (ppm)	Pb (ug/m^3)
	24-Hour (ug/m^3)	Annual (ug/m^3)	24-Hour (ppm)	Annual (ppm)				
San Diego	90	44	.018	.006	10	.032	.19	.07
El Paso	222	69	.059	.015	13	.022	.17	.42
U.S. NAAQS***	150	50	.14	.03	9	.05	.12	1.5

* The PM-10 entries are the EPA 1989 "design values"; SO_2 24-Hour and CO are second-highest levels for 1989.

** The 0_3 entry is the EPA nonattainment "design value" for 1987-1989.

(Source: EPA Aerometric Information Retrieval System Data).

TABLE 2b

BORDER COUNTIES WITH RURAL AREAS VIOLATING THE PM-10 NAAQS

California: Imperial County

Arizona: Pima, Cochise, Yuma, and Santa Cruz Counties

New Mexico: Dona Ana County

monitoring network in many Park areas in the Southwest U.S. Many show a sizable number of days with degraded visibility.

A key indicator of the potential for ambient air pollution problems is an inventory of air emissions from various sources. Air pollution emission inventories on the U.S. side for the relevant criteria pollutants have been prepared for most of the nonattainment areas cited above, and inventories for all nonattainment areas are required by the Clean Air Act Amendments of 1990. Data on emissions and characteristics of major point sources (over 100 tons per year per facility) are reported by state or local agencies in the U.S. to EPA. Table 3 reflects the latest national data available; it summarizes industrial and area (including vehicular) source emissions as compiled by the National Acid Precipitation Assessment Program for 1985.

Sulfur dioxide (SO_2) emissions from copper smelters and utilities on both sides of the border have been a concern in the past but are currently not having major effects on ambient SO_2 levels due largely to cooperative efforts between the two governments under Annex IV to the 1983 U.S.-Mexico Border Environmental Agreement, which was adopted in 1987 and effected a standard emission limitation on American and Mexican border copper smelters. Such smelters are a major source of SO_2 emissions, as attested by the point source totals for Cochise County, Arizona, Hidalgo County, New Mexico, and El Paso County, Texas, shown in Table 3. (The Cochise County emissions are for a period prior to the 1987 shutdown of a major copper smelter there, in compliance with Annex IV.)

Numerous industrial sources in Mexico can affect American air quality. Figure 1 illustrates the Mexican border production breakdown. Throughout the border area, approximately 1,400 maquiladora plants are clustered in Mexico. Although emissions inventories from such plants are only now being compiled, there is concern over the volatile organic compound (VOC) emissions of plants, that manufacture electronic and electric equipment, material, and supplies; transportation equipment, and furniture. The manufacture of these goods and others involves processes, notably the use of paint coatings and solvents, that result in the emission of VOCs. VOCs are major precursors of ozone formation, and they contribute significantly to air toxicity.

Some specific information on VOC emissions has recently been obtained. According to a 1991 study for EPA by SECOFI, electronic and electric equipment, material and supplies accounted for more than 40% of all products produced in Mexican border state industries, and transportation equipment and supplies made up almost 15% of all products. It is unclear what percentage of all

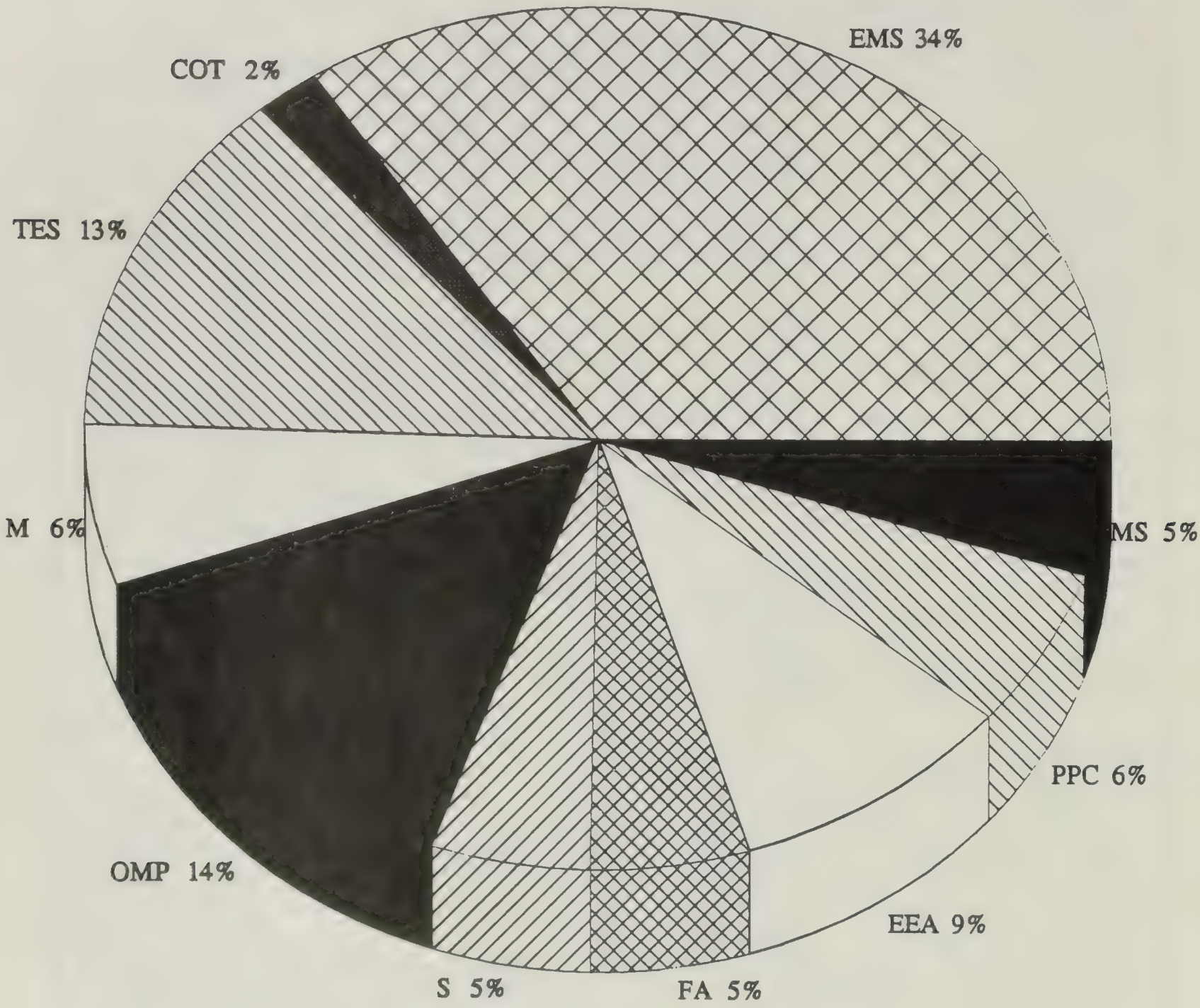
TABLE 3

U.S. BORDER AIR EMISSIONS
(From 1985 National Acid Precipitation Assessment Program in tons/year)

State	County	Type	SO2	TSP	VOC	NOx	CO
Arizona	Cochise	Point	335,402*	1,377	1	5,495	12
		Area	581	23,074	7,015	5,298	38,453
Arizona	Pima	Point	14,473	308	0	0	0
		Area	3,228	179,405	33,108	23,491	82,942
Arizona	Yuma	Point	19	20	15	596	67
		Area	530	7,659	5,913	4,663	19,929
California	Imperial	Point	312	349	7	1,279	103
		Area	402	4,876	6,574	4,784	26,045
California	San Diego	Point	1,500	657	4,358	4,018	1,464
		Area	8,860	77,527	115,386	68,350	325,761
New Mexico	Hidalgo	Point	98,836	1,329	21	1,067	104
		Area	59	19,644	1,112	742	6,120
New Mexico	Luna	Point	4	0	1,081	2,846	410
		Area	193	21,012	2,282	1,633	14,583
Texas	Cameron	Point	3	16	21	1,873	209
		Area	2,659	49,527	13,219	12,996	50,198
Texas	Culberson	Point	429	43	12	1,868	115
		Area	99	29,462	747	1,035	2,454
Texas	Dimmit	Point	1,693	8	78	140	974
		Area	84	13,850	543	796	2,132
Texas	El Paso	Point	31,250	2,413	3,663	5,614	1,420
		Area	5,365	135,058	30,038	28,153	149,806
Texas	Hidalgo	Point	2	865	4	998	159
		Area	1,953	79,069	13,829	15,143	59,365
Texas	Starr	Point	0	0	24	1,594	211
		Area	125	9,160	1,183	1,314	4,563
Texas	Terrell	Point	0	0	22	665	122
		Area	35	19,496	119	303	350
Texas	Webb	Point	1,372	62	3	548	5,415
		Area	553	63,804	4,364	4,818	16,760

* Does not reflect 1987 shutdown of a major smelter. (See discussion at p. 73)

Figure 1
Products Produced by Mexican Border Industries as of 1991
(Source: EPA and SEDUE)



PPC Petroleum, Petroleum Products, Plastics, Chemicals	**M Metal Industries**
EEA Electronic/Electric Equipment/Apparatus	**TES Transportation Equipment & Supplies**
FA Food and Agricultural	**COT Clothing and other Textiles**
S Services	**EMS Electronic/Electric Materials & Supplies**
OMP Other Manufactured Products	**MS Medical Supplies**

maquiladora products furniture represents; however, in 1986 it was estimated at 10%. A U.S. General Accounting Office (GAO) study conducted in the spring of 1991 reported that Mexico had not yet established air pollution standards for paint coatings and solvents in the border region.

Maquiladoras are not the only sources of air pollution in Mexico with potential to affect the air quality of the U.S. In fact, several important indigenous industries located in the Mexican border area are highly polluting. These industries include oil and gas, metallurgy, iron and steel, electric power generation, cement manufacturing, mining, and brick manufacturing.

Motor vehicle emissions are another, major air pollution source. Preliminary results from a joint SEDUE-EPA vehicular testing program in Juarez in fall 1990 show the Juarez fleet to suffer from a very high level of tampering, which perhaps reduces the combustion efficiency of the vehicles to an early- to mid-1970s American level. Inefficient automobile fuel combustion results in high emissions of VOC, nitrogen oxides, carbon monoxide, and particulate matter. Although no similar data now exist for Tijuana or Mexicali, it is likely that a similar vehicular generation exists in such other border towns.

Area sources (including residential sources) emit large quantities of particulate matter and carbon monoxide. Many residences in the Mexican border area burn non-traditional fuels to provide warmth in the winter. Such fuels include wood scraps, cardboard, and tires. In adjoining U.S. areas in the same airshed, constricted airflow due to terrain and/or temperature inversions exacerbates the effects of these emissions, causing dangerously high levels of particulate matter and carbon monoxide. One example of such an ambient situation is illustrated in Figure 2, for particulate matter levels in El Paso-Juarez during a late autumn day.

As was previously mentioned, border visibility is a worrisome issue. Malm, et al.[15] have performed air parcel trajectory analyses and filter analyses from samplers in U.S. National Park Service areas near the border. They have found that, during some periods of poor visibility in areas such as Big Bend and Guadalupe Mountains/Carlsbad Caverns National Parks, Mexican sources as far away as Monterrey may be significantly contributing to the

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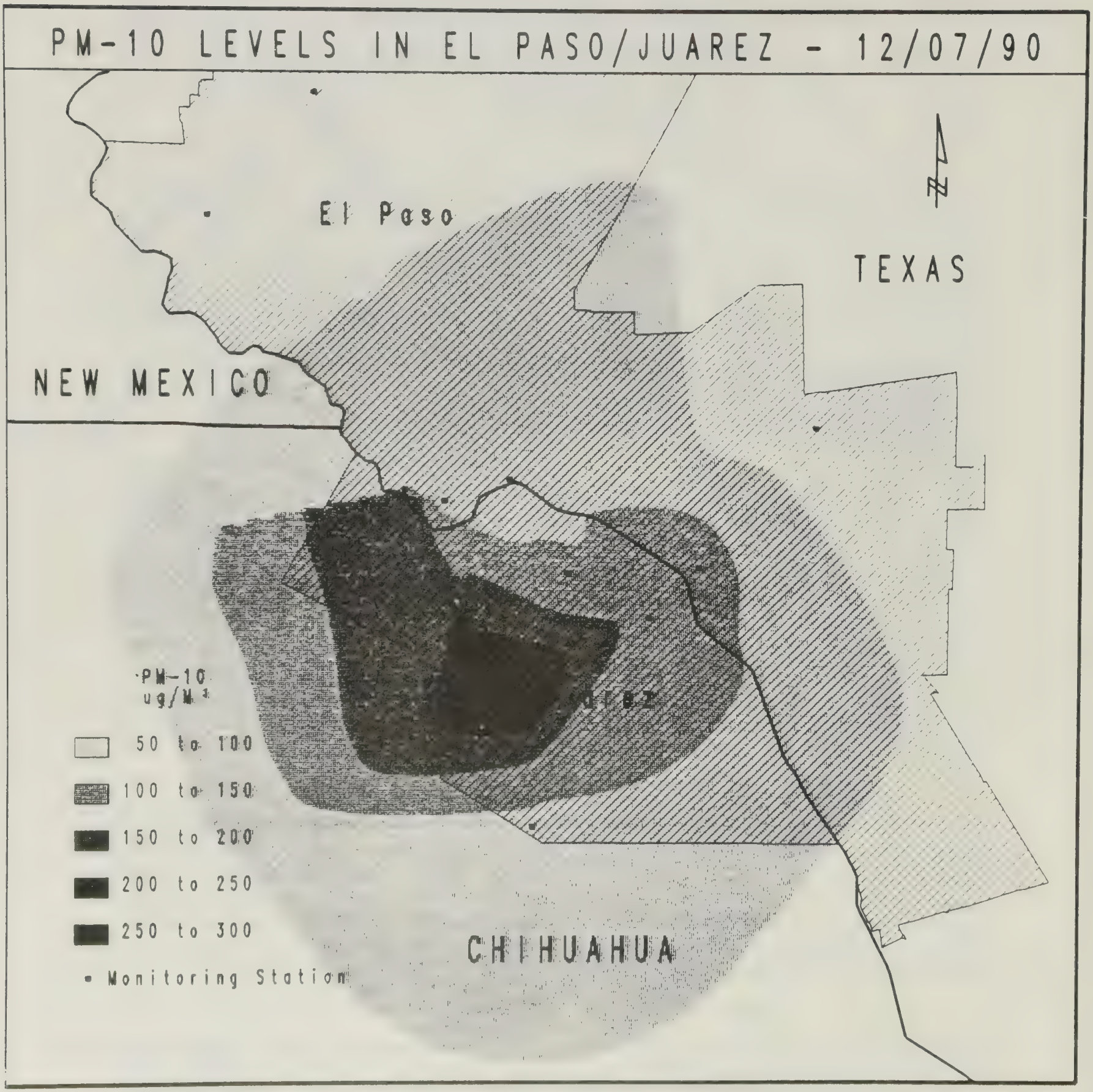
[15] Malm, W., Gebhart, K., and R. Henry, 1990. "An Investigation of the Dominant Source Regions of Fine Sulfur in the Western United States and Their Areas of Influence," Atmospheric Environment (12): 3047-3060.

Figure 2


PM-10 LEVELS IN EL PASO/JUAREZ - 12/07/90
El Paso
TEXAS
NEW MEXICO
CHIHUAHUA
PM-10
ug/M³
50 to 100
100 to 150
150 to 200
200 to 250
250 to 300
Monitoring Station

degradation in visibility. Although not the only source area of concern (the Texas Gulf Coast area is also implicated), it is important to recognize the international component of visibility problems in American National Park areas.

As a result of Annex V to the 1983 Border Environmental Agreement, signed in October 1989, the U.S. and Mexico are able to grapple with some of these problems by cooperatively investigating trans-border urban air pollution transport in Juarez-El Paso, Mexicali-Imperial County, and Tijuana-San Diego. In Juarez-El Paso since February 1989 SEDUE and EPA have sponsored three air quality and meteorological field studies, a field investigation to support a refined Juarez emissions inventory, a long-term Juarez ambient monitoring network of four sites, a Juarez vehicular emissions survey, and a sampling of gasoline volatility at approximately 20 Juarez retail gasoline stations. In Mexicali-Imperial County SEDUE and EPA are supporting monitoring and receptor modeling to identify the source types responsible for the inhalable particulate matter (PM-10) problems in the airshed. In the Tijuana-San Diego area, SEDUE has recently activated the first long-term monitoring site in Tijuana, and plans are underway to initiate a Tijuana vehicular inspection/maintenance (I/M) program.

Stimulated by Fiscal Year (FY) 1989 and FY 1990 special Congressional allocations, field studies took place in El Paso-Ciudad Juarez in February 1989, December 1989, September 1990, and April 1991 and have included LIDAR (Light Detection and Ranging) flights, visibility and PM-10/PM-2.5[16] sampling, long-and short-term meteorological studies for windfield model evaluations, the establishment of a long-term Juarez air monitoring network (PM-10): four sites; ozone: two sites; carbon monoxide: two sites; meteorology: two sites), and emissions inventorying of Juarez mobile, stationary, and area sources. El Paso-area ambient problems include those for ozone, carbon monoxide, and PM-10.

Currently in El Paso-Ciudad Juarez, the long-term monitoring network (begun in June 1990) continues operation at four locations in Juarez. The Juarez stationary source emissions inventory work continues, while EPA-Office of Mobile Sources is assisting Region VI in using the MOBILE model to calculate Juarez fleet emissions factors. EPA-Region VI contractors are evaluating whether dispersion or receptor models are appropriate to stimulate air quality in El Paso-Ciudad Juarez and what type of windfield model is applicable, if dispersion modeling is used.

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[16] Particulate matter with a diameter of 2.5 microns or less.

In the Mexicali-Imperial County area, an EPA contractor has prepared a study protocol for PM-10 receptor modeling on each side of the border. Plans exist to begin the field study in the spring of 1992. The study plan has been developed to acquire chemically speciated measurement at sources and receptors, and to apply receptor models to apportion PM-10 to its sources. EPA and SEDUE are working with a contractor, the Desert Research Institute, as well as the Imperial County Air Pollution Control District and the California Air Resource Board (CARB). EPA will soon begin implementation of the study plan.

In Tijuana, the first air quality monitoring station is operating in an experimental mode. The roles of the participating agencies have been defined as follows: SEDUE -- site location and daily operation; EPA -- instrumentation, funding, and overall coordination; CARB -- periodic quality assurance; and San Diego Air Pollution Control District (SDAPCD) -- weekly quality assurance and routine maintenance. EPA, SEDUE, CARB, and SDAPCD have also been meeting to discuss the reduction of motor vehicle emissions in the San Diego/Tijuana Border area with particular emphasis on those vehicles used for commuting on a regular basis from Tijuana to San Diego.

c. Possible Environmental Effects of the NAFTA

General Discussion of Border Area Effects

It is likely that industrial growth will continue in the border area with or without a NAFTA. Undoubtedly, there will be associated air impacts along the border. However, there is also the potential for air impacts due to NAFTA at locations away from the border in the interior U.S. In the following paragraphs, first the border, then the U.S. interior NAFTA air impacts will be discussed.

As described above in section III. A, all forecasts of border area economic growth have a substantial range of uncertainty. Based on the volatility of past growth patterns and ongoing changes in Mexico's economy, plausible baseline forecasts of border growth, therefore, could range between 5 and 15% per year. With the removal of trade barriers that would accompany a NAFTA, the already brisk U.S.-Mexico trade will be enhanced. However, as was previously mentioned, with NAFTA the relative economic advantage of the Mexican border region over cities in the Mexican interior may be considerably less than it is with the current maquila system. How this change in the economic situation will affect where new firms locate in Mexico is unclear.

Nevertheless, it is possible to specify two plausible scenarios to express the effect of NAFTA on the baseline

economic projection. In scenario one, the relative weight of the border in Mexican growth is unchanged. In a second scenario, NAFTA leads to relatively more investment in the Mexican interior. As previously discussed, the former projection might reasonably result in a 6-17% annual growth rate in Mexican border industry in the Mexican border region, while the latter projection might be expected to result in a 4-12% annual industrial growth rate in the Mexican border region.

Regardless of which of the above projections proves to be most accurate, the number of Mexican pollutant-emitting facilities will increase; this will prompt Mexican commercial and residential pollutant increases that will affect the U.S. and will prompt concomitant increases in U.S. sister cities as well.

However, this is only part of the story, as Figure 3 shows. Figure 3 conceptually illustrates air quality effects on the U.S. border region assuming three policy cooperation scenarios that vary only in the success by which these emission increases are controlled. The representations in the figure should be considered in relative, not absolute, terms. Scenario A would result if the growth-related pollutant increases in Mexico are unabated due either to failure of the new, proposed SEDUE control initiatives or to failure to implement these initiatives. Scenario B would result assuming the currently planned EPA-SEDUE air technical initiatives as enunciated in the Integrated Environmental Plan for the Mexican-U.S. Border Area (Border Plan) are carried out on time. Scenario C would result if the Border Plan initiatives are significantly enhanced and accelerated.

Given the significant institutional and technical problems in effecting a comprehensive, harmonized air pollution control program on both sides of the border, Scenario C must be considered impractical. Scenario B must be considered likely, given the current, significant resolve shown by the U.S. and Mexican governments in commitments contained in the Border Plan and the expected, rapid growth of industrial, commercial, and residential sources. Realistic scenario B actions include enhanced industrial inspections and enforcement, tighter new automobile emissions standards, start-up of vehicular inspection/maintenance (I/M) programs in Juarez and Tijuana, and retrofitting and retirement of existing, highly polluting industries (such as brick manufacturing facilities in Juarez) (see the Environmental Policy and Program Options discussion later in this Section). Scenario B would mean that, after an initial, short-term emissions increase that will probably translate into some worsening of U.S. border air quality for criteria

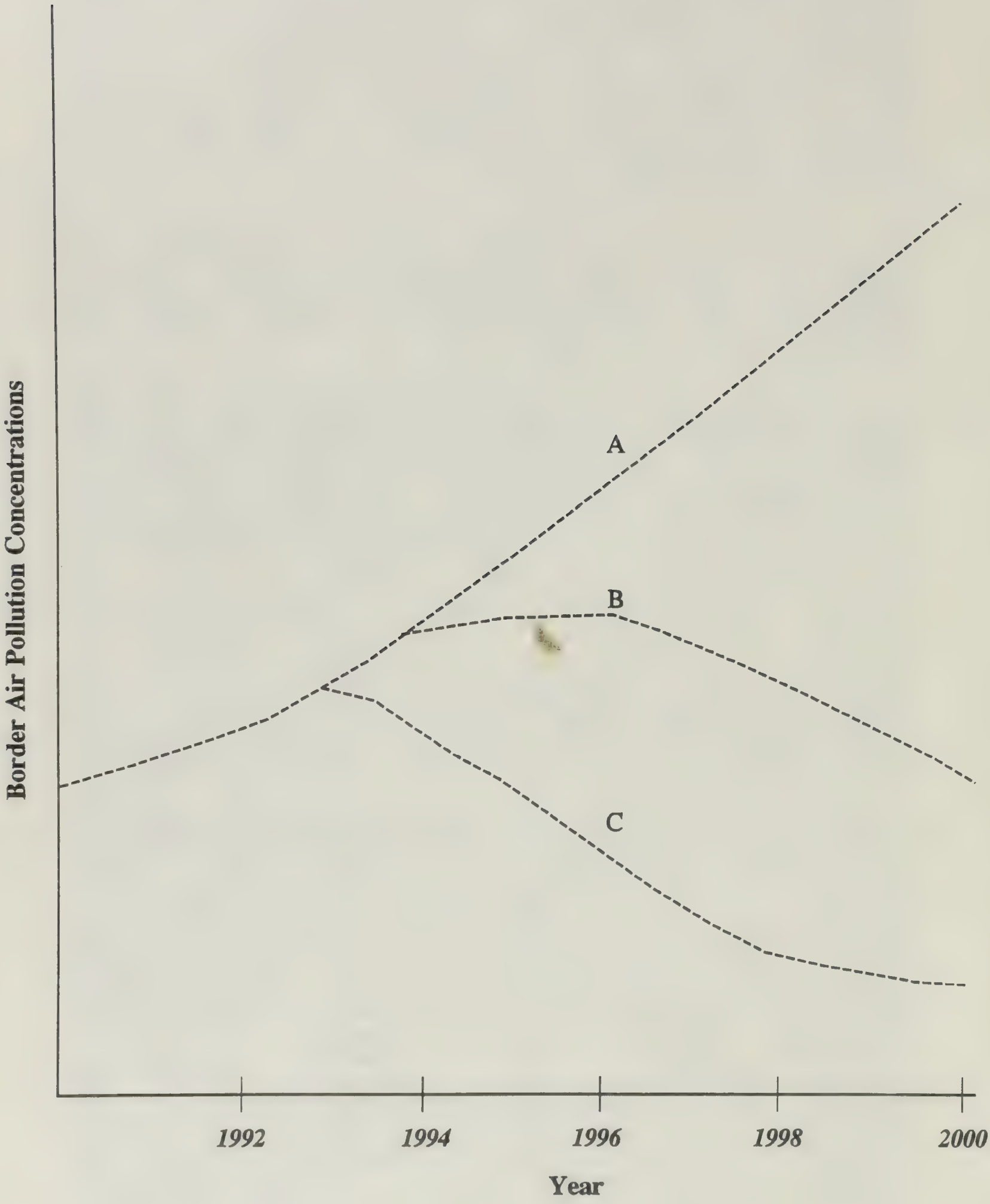

Figure 3. Border Air Pollution under Alternative Control Scenarios

pollutants (at least in some locations), the new SEDUE-EPA Border Plan initiatives will prompt a rapid reduction in air pollution concentrations. However, Scenario A cannot be ruled out;this is surely a distinct possibility in a no-NAFTA future, since limited Mexican Government revenues would constrain available resources for air emissions control.

In the following paragraphs, the baseline growth estimate and two different NAFTA effects scenarios are assessed for their implications for air emissions changes under varying policy cooperation scenarios. These air emissions estimates are extrapolations given historical trends and the current state of knowledge about Mexican air emissions. They should be interpreted as illustrations, not forecasts. The composite air emission estimates are based upon an overall assumption that 20% is industrial, 50% is vehicular, and 30% is residential/ commercial. Table 4 summarizes these estimates.

Border Effects with NAFTA -- Scenario 1

With expected annual Mexico border industrial growth of between 6 and 17%, over ten years there would be a cumulative increase in Mexico border industry of between 79 and 380%. If past population-maquila relationships hold, the Mexican border population would increase by approximately 50-230% in 10 years.

With such growth adjacent to the U.S. border, it is highly likely that Mexico would concentrate abatement efforts along the border; therefore, policy cooperation scenario B is much more likely. A scenario B future could reasonably hold such industrial emission increases to 40-250% over those 10 years, depending upon the magnitude of the industrial growth.

Even with a significant population increase and increases in vehicle miles traveled, the Mexican federal requirement of catalytic converters on Mexican-produced automobiles beginning with the 1991-1992 model year, coupled with aggressive implementation of vehicle I/M programs, could result in a sizable decrease in vehicle pollution (30%) with a lower growth rate. However, with growth at the higher end of the plausible range, there would still be a significant increase in vehicular air emissions (perhaps 120%).

For residential/commercial emissions, the growth Scenario 1 projection could translate into an approximate 20-180% increase in such emissions if control scenario B is a reality. Such an increase would be in spite of Mexican Government subsidies for cleaner heating fuels and upgraded residential housing.

Table 4. Border Air Emissions/Impacts Changes 1991 - 2001 Under Three Growth Projections (all estimates are approximate)

Projection	Mexican Composite Air Emissions Change
with NAFTA -- growth scenario 1 and policy cooperation Scenario B	no change to profound increase (0%-165%)
with NAFTA -- growth scenario 2 and policy cooperation Scenario B	moderate decrease to significant increase (-20% - +85%)
no NAFTA -- policy cooperation Scenario A*	significant to profound increase (40%-225%)
-- policy cooperation Scenario B	slight decrease to profound increase (-10% - +125%)

Under all three growth projections, border air emissions from U.S. sources would experience slight to moderate decreases (20%-30%) between 1991 and 2001.

Projection	Estimated U.S. Visibility Impacts
with NAFTA -- growth scenario 1 and policy cooperation Scenario B	little/no change to remarkable, additional degradation
with NAFTA -- growth scenario 2 and policy cooperation Scenario B	little/no change to significant, additional degradation followed by stabilization and perhaps improvement
no NAFTA -- policy cooperation Scenario A	remarkable, additional degradation, with no known future improvement
-- policy cooperation Scenario B	little/no change to remarkable, additional degradation

* Scenario A denotes a reduced level of Mexican air pollution control; scenario B denotes a high level of Mexican initiative; see text

Thus, under the growth Scenario 1 projection, in 10 years the composite Mexican border air emissions impacting the U.S. in the most likely control scenario (scenario B) might vary from little or no change in the case of the lower industrial growth rates to profound change (over 150%) in the case of the higher industrial growth rates.

As discussed below, visibility effects in American park areas are difficult to quantify. Little or no additional visibility degradation might occur with lower industrial growth rates in the Border. However, with higher industrial growth, profound air emissions increases would probably cause remarkable, additional visibility degradation.

Border Effects with NAFTA - Scenario 2

With expected annual industrial growth of 4-13%, there may be a cumulative increase of between 48% and 239% in Mexican economic activity at the border within 10 years. If past maquila industrialization-population trends presented by EPA and SEDUE (1991) hold, a Mexican border population increase in the range of 30% to 150% could be expected.

With the likely policy cooperation scenario B emissions control future (Figure 3), (see specifics in Section III.C.2.d.) Mexican border air emissions increases should be minimized.

With aggressive inspections/enforcement, the industrial emissions might still rise 20% to 150% in 10 years. With increasing integration of the border economies, Mexican industrial fuels will probably increasingly tend toward natural gas, as is common on the U.S. side of the border (NAFTA provisions can encourage such a shift as discussed in Chapter III). Greater use of natural gas would significantly reduce CO_2 emissions, an important global-warming gas, over those experienced with fuel oil or coal.

The most significant advantages from enhanced SEDUE activity should come in controls on vehicles. There is currently a requirement of catalytic converters for Mexican-built cars beginning in the 1991-1992 model year, coupled with a SEDUE goal of meeting the EPA new car emission standards (.41 g/mi of hydrocarbons, 3.4 g/mi of carbon monoxide, and 1.0 g/mi of nitrogen oxides) by 1993. Also, the start of inspection/maintenance programs in Juarez and Tijuana and increasing availability and use of American gasolines in Mexico (which are unleaded and, in some cases, oxygenated) are reasonable expectations within the next one to five years. With scenario B in 10 years, a vigorous enforcement of these measures (particularly of

local inspection/ maintenance programs) could reasonably produce a change in the Mexican border fleet emissions of between -50% and +50%, depending upon the extreme of industrial growth.

The change in emissions due to residential/commercial growth is less clear. With increasing employment and personal wealth, Mexican citizens should be able to afford higher living standards that would decrease the need to burn non-traditional fuels in residences. However, the timing of this estimated transition to increased wealth is problematic. An overall increase in personal income depends upon the speed and magnitude of new plant construction and the geographic distribution of these new facilities. This is true since, if new job creation lags behind the number of new workers entering the labor force, wages will undoubtedly remain very low (the current average, daily maquila wage being perhaps $4 - $10). In this context whether or not a NAFTA comes into force may be critical. The additional economic growth arising from economic and trade opportunities in a NAFTA may allow job creation to match or exceed labor force growth; this will allow for the income increases that will stimulate consumers to switch from non-traditional fuels.

Given a reasonable schedule for construction of new, basic housing, residential/commercial emissions under scenario B may increase 10-100% within 10 years. Again, the uncertainty in degree of industrial growth necessitates a wide estimate.

Thus, in 10 years, under the most likely air emissions control scenario (policy cooperation scenario B), changes in composite Mexican border air emissions that probably effect the U.S. may range between an approximate 20% decrease to an 85% increase. It should be noted that the changes for Mexican emissions are unlikely to be monotonic; that is, it is likely that immediately following the NAFTA approval sizable air emissions increases will occur that enhanced SEDUE-EPA efforts will assuage as the 1990s progress.

In all three projections, growth in the immediate American border area is also expected. This growth should be less pronounced than in Mexico but should be significant particularly for existing large- and mid-sized border communities.

However, with many of the American areas already under State Implementation Plan (SIP) orders to reduce criteria pollutants, with the existing American New Source Performance Standards (NSPS) and the Prevention of Significant Deterioration programs for new sources in effect, and with the significant reductions planned through the Clean Air Act Amendments of 1990, it is likely that air

emissions will continue their long-term decrease through the 1990s. Industrial emissions and residential emissions may increase slightly, but it is likely that these will be offset by continued decreases in vehicular fleet emissions. Thus, in all three projections, air emissions from American border areas should experience an overall decrease of 20%-30% over the next ten years, an amount approximately equal to historical trends in the 1980s.[17]

Also, the visibility effects in American National Park areas from these Mexican and American emission changes are difficult to quantify; however, with growth scenario 2 likely futures range from marginal, additional degradation soon after NAFTA approval, followed by stabilization and improvement, (in the case of a lower industrial growth rate) to significant, additional degradation soon after NAFTA, followed by slower degradation and eventual stabilization (in the case of a higher industrial growth rate).

Border Effects with no NAFTA

Without approval of a NAFTA, it is uncertain that the current factors affecting Mexican border emissions will remain the same. Disapproval of a NAFTA may not mean a return to a status quo.

The current status of Mexican border emissions is the following: on the negative (emissions increase) side, new maquilas are rapidly being built but these industries are low-wage, salaries being insufficient to provide the increasing Mexican border populations with much more than a subsistence wage. The increase in population is not coupled with a significant increase in wealth that can subsidize newer, less polluting automobiles and more traditional residential heating fuels. On the positive (emissions decrease) side, SEDUE, in anticipation of a NAFTA, has enhanced its environmental commitment, with the Government of Mexico much more amenable to close cooperation with the U.S. to harmonize pollution abatement efforts along the border.

If NAFTA is not approved, the negative (emissions increase) side of the border air pollution formula will not change its direction. The maquilas will continue to be

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[17] U.S. Environmental Protection Agency (EPA), 1991a. National Air Quality and Emissions Trends Report, 1989, EPA-450/4-91-003, Office of Air Quality Planning and Standards, Research Triangle Park, NC. 134 pp.

built, and the Mexican border populations will continue to increase. It is likely that wages will not improve in a relative sense, so that widespread retirement of highly polluting automobiles and residential fuels will not occur. However, how the positive (emissions decrease) side of the formula responds is unclear. There are two plausible outcomes.

First, the Mexican Government may lower its forecast of revenues so that it would probably be impossible to maintain the current and projected levels of SEDUE cooperation with EPA to improve border air quality. Political considerations may lead SEDUE to invest those resources in Mexico City and other large, interior cities, where the great bulk of the country's population resides and where the concentration of industry is the greatest. To illustrate the level of authorized air quality effort in Mexico that can be expected along the border, total Fiscal Year (FY) 1991 SEDUE environmental protection resources are estimated at $36 million (a sizable increase from FY 1990). The air budget is unknown, but a reasonable estimate may be $12 million. This compares with a FY 1992 EPA air budget of $447 million.[18]

Thus, because SEDUE may well not be able to afford the planned enhancement of compliance/enforcement along the border or I/M programs or financing of retrofits for existing, highly polluting sources, control scenario A becomes a distinct possibility. With approximately 63-305% more maquilas in 10 years, no-NAFTA industrial emissions under scenario A may be expected to increase by 60-320%. With a concomitant, estimated 40-180% increase in population in 10 years, vehicular emissions may increase 40-200%, even taking into account a functional, centralized Mexican system of new automobile controls. Residential/ commercial emissions may increase 40-200%, approximating population growth. Therefore, composite Mexican border emission increases could be in the significant to profound range (40%-225% increase).

Concerning visibility impacts on American park areas, it is likely that a scenario A future would profoundly impair existing visibility resources in U.S. border-area parks. Unlike the other two, preceding projections, the no-NAFTA scenario A projection would not hold an inherent opportunity for stabilization and improvement of this visibility degradation.

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[18] U.S. Environmental Protection Agency (EPA), 1991b. "Administrator's 1993 Passback NPM for Air & Radiation," August 1991.

The second plausible, future emissions outcome assumes that Mexico would somehow continue its aggressive border clean-up, as outlined in the pending Border Plan document. This would ensure a scenario B level of activity.

With a no-NAFTA, policy cooperation scenario B future, assuming the same 63-305% Mexican border industrial growth, one could expect an increase in industrial air emissions in the 25-200% range. With an associated population increase of 40-180% but with an active vehicular I/M program and a federal new-car requirement for EPA-like emissions standards, it is reasonable to expect a 40% decrease in vehicular emissions in 10 years with the lower industrial growth rates; however, with higher industrial growth, vehicular emissions may increase by 90% For residential/ commercial sources, air emissions may increase approximately 15-140%, in spite of anticipated Mexican Government efforts to subsidize cleaner-burning residential fuels. Thus, in 10 years, a no-NAFTA, scenario B future might result in changes in emissions ranging from a slight decrease (0-10% decrease) with the lower industrial growth projections to profound emissions increases (125%) with the higher industrial growth projections.

For visibility, the no-NAFTA scenario B future could range from little or no change (lower industrial growth) to profound, additional impairment (higher industrial growth). This would approximate the effects expected under a "with NAFTA -- border surge" future.

In summary, it is impossible to extrapolate emission trends for each individual air pollutant and each and every part of the 2,000 mile U.S.-Mexico border. However, as Table 3 illustrates, reasonable estimates show that Mexican border emissions affecting the U.S. may well be less with NAFTA than without NAFTA.

Air Effects on the U.S. Interior

General Discussion of U.S. Interior Effects

If the proposed NAFTA becomes a reality, there will be a variety of transportation-related air quality impacts caused by this Agreement on areas of the U.S. beyond the immediate border area. These will be caused by (1) U.S. registered motor vehicles (automobiles and trucks) entering Mexico and returning to the U.S., (2) Mexico registered motor vehicles entering the U.S. and returning to Mexico, and (3) U.S., Mexican, and Canadian motor vehicles transiting the U.S. in the case of trade between Mexico and Canada. This discussion will lay out in qualitative terms some of these impacts on "interior" U.S. air quality, as the U.S.-Mexico border impacts have been discussed elsewhere.

The Mexico automobile fleet can be characterized as poorly controlled regarding exhaust emissions. This is due to many years of no emission standards and widespread tampering. The poor state of the existing vehicle fleet was confirmed, for example, by the SEDUE/EPA vehicle testing program in Juarez in fall 1990 referred to earlier. Mexico is now enforcing oxidation catalyst-forcing emission standards for its domestically-built and imported vehicles (with manufacturing plant-wide averaging, thus allowing non-catalyst automobile production) and will introduce current U.S. standards (with no plant-wide averaging) in 1993. These "current U.S." standards are 0.41 HC, 3.4 CO, 1.0 NOx, all in g/mi. All of the standards are based on the U.S. Federal Test Procedure.

The gasoline most commonly available in Mexico is leaded, although unleaded is available in larger cities and on main trunk lines. In December 1991, the Mexican government cut the price margin between leaded and unleaded fuels in half (by raising the price of leaded fuels at a faster rate).

There is reported to be progress in making unleaded fuel available in more of the country where unleaded is not currently available. Since Pemex has a national monopoly on the sale of vehicle fuels, the government is well placed to ensure that this goal is met. In particular, the government is seeking to ensure that unleaded fuel is available on all toll roads and major intercity routes. The volatility of Pemex's gasoline is reported to be between 7.0 and 9.5 psi.

The truck fleet is generally powered by diesel engines with no significant level of emission control. These engines are produced mostly by foreign manufacturers operating in Mexico, with some engines imported from outside North America as well. On November 19, 1990, Mexico adopted a new engine emission standard based on the European 13-mode diesel emission test procedure. This new emission standard represents a minimal amount of emission control. Mexico is currently considering a future standard based on the U.S. heavy-duty engine procedure, which is a more rigorous procedure and would lead to better emission control.

The diesel fuel found in Mexico is generally of a good cetane level but very high in sulfur. There is reportedly a high level of particulate (sediment) contamination in the diesel fuel that can be removed by careful filtering. There are plans to reduce the sulfur level of at least a part of the diesel fuel pool, but only to 0.10 weight percent.

In the U.S., interim truck engine NOx and particulate emission standards took effect January 1991, with final,

more stringent, standards effective in 1994. (The 1990 Clean Air Act requires a further reduction in NOx, effective in 1998.) These final 1994 standards will require low sulfur fuel and thus the U.S. has promulgated regulatory limits on fuel sulfur of 0.05 weight percent maximum, effective in late 1993. Reducing fuel sulfur directly reduces particulate matter from diesels. Also, the engine aftertreatment devices (e.g., catalysts) expected to be used to meet the final 1994 standards could be damaged by high levels of fuel sulfur.

Effects of a NAFTA on U.S. Interior

This discussion will be confined to those impacts away from the border area, i.e., more than a tank full of fuel driving distance. Thus, the effect of Mexico fuel use on U.S. border air quality will not be considered. The first part of this discussion will focus on gasoline-fueled vehicle usage. In this discussion, it is assumed that current U.S. gasoline-fueled light-duty vehicle emission standards will be implemented by Mexico as scheduled in 1993. Also, it is assumed that the close cooperation between the U.S. and Mexico brought about by the NAFTA will result in future alignment of emission standards as well, which would result in Mexico adopting the more stringent standards comparable to those mandated by the U.S. Clean Air Act, in accordance with its domestic law and regulatory procedures. Mexico would take such an action pursuant to its own law and regulatory procedures. Thus, Mexico will be assumed to (1) adopt the more stringent U.S. "Tier 1" standards due to take full effect in the U.S. in 1996, (2) may adopt better fuel quality regulations, and (3) may adopt better I/M programs.

If it can be assumed that the NAFTA will result in increased prosperity in Mexico, then one can assume that more of the new catalyst-equipped vehicles will be purchased by Mexicans. One can also assume that these vehicles will be able to be maintained better, possibly encouraged by a better I/M program made possible by increased Mexican prosperity. Also, increased prosperity may result in more trips to non-border U.S. cities. This increase in vehicle miles traveled (VMT) in U.S. cities will not result in a major increase in the emissions inventory if the vehicles are, in fact, properly operating vehicles using current technology.

Another area of consideration is U.S. light-duty vehicles which occasionally transit Mexico and thus use Mexican fuels. The main area of concern is the unavailability of unleaded fuel. Thus, if unleaded fuel cannot be purchased, the driver may use leaded fuel thus greatly diminishing the effectiveness of the catalyst, leading to a much more polluting automobile. The catalyst

may have to be replaced (especially if the car is usually used in an I/M area) and thus the owner would incur a substantial cost.

If it is assumed that the NAFTA brings added prosperity to Mexico, which brings more catalyst equipped cars, expanded availability of unleaded fuel must also result. This should, in turn, decrease the problem of U.S. cars having to use leaded gasoline.

As far as trucks are concerned, currently U.S. trucks are not permitted over the border into Mexico, and Mexican trucks are permitted in the United States only as far as the border commercial zone. The goal for trucking in the NAFTA negotiations is to reduce mutually restrictive barriers that impede efficient transportation. The most likely outcome, at least in the near term, is some form of partial access for U.S. and Mexican commercial vehicles, with full and free access to both countries coming over the long term.

For this scenario, it is assumed that the NAFTA will bring with it an equalization of heavy-duty (HD) engine emission standards between Mexico and the U.S. It will also be very important for Mexico to implement a low sulfur diesel fuel requirement, due to the negative impact of fuel sulfur on expected future HD diesel aftertreatment devices. This fuel must also be made widely available.

Thus, with U.S. type standards (and test procedures) and low sulfur fuel, the Mexican trucks operating in the U.S. would emit pollutants at roughly the same rate as U.S. trucks. Thus the only negative impact would come from any net increase in overall truck traffic resulting from increased economic activity.

Effects of No NAFTA on U.S. Interior

A maintenance of the status quo would presumably see a situation where Mexico would implement the current U.S. automobile standards but may not keep up with the U.S. as Tier I standards are implemented. Also, the Mexican automobile fleet may not be renewed as quickly, I/M programs may not improve and unleaded gasoline may not become more available. All of these influences would tend to result in a net increase in emissions from the Mexico automobiles operated in the U.S.

In summary, stringently controlled catalyst equipped cars that are properly maintained and always use unleaded fuel are the desired goal, both here in the U.S. and presumably in Mexico. If a vehicle is not catalyst equipped or does have a catalyst but is improperly maintained or uses leaded fuel, it can be considered a

"gross emitter" and will have a negative impact on air quality wherever it is driven.

While it may not be known with exact certainty how a NAFTA or lack of a NAFTA will affect the Mexico automotive fleet and fuels, it is certain that a well-controlled (and maintained) fleet and good quality fuels cost more money than poor quality fuels and non-catalyst vehicles. If indeed a NAFTA results in greater prosperity for Mexico, then this should result in more available money for well controlled and maintained vehicles and better fuels. This will, in turn, benefit both countries.

The situation is somewhat more complex regarding impacts of truck traffic from Mexico on air quality in the U.S, interior. Some consider it likely that no-NAFTA will result in a continuation of the existing barrier to truck traffic beyond the border commercial zone. If this becomes the case, Mexico trucks will not affect interior U.S. air quality. However, there is a finite chance that the barriers could be eliminated through a separate bilateral negotiation. Thus, it may be worthwhile to examine free cross-border truck traffic with continued Mexico use of the existing European HD diesel emission standards and current high sulfur fuel. Continued use of European HD diesel standards and high sulfur fuel is not a necessary consequence of no NAFTA, but it is more likely than with a NAFTA.

Under this scenario, each truck would emit more pollutants than would be the case had Mexico adopted U.S. standards. This would result in an increase in pollutant loadings (especially NOx and particulate) in cities transited by Mexico trucks. Also, U.S. trucks using catalytic aftertreatment and high sulfur Mexico diesel fuel could experience a degradation of emissions performance, both in Mexico and upon return to the U.S. This could create enforcement problems in the U.S., as the engine manufacturer could claim that a recall action based on emission results from such engines would not be possible because the truck legally transited Mexico and thus legally used high sulfur fuel.

d. Environmental Policy and Program Options

Various mitigation options exist or are planned to minimize the air impacts of the NAFTA. These include the 1983 U.S.-Mexico Border Environmental Agreement (particularly Annexes IV and V), the Integrated Border Environmental Plan, the 1990 Clean Air Act Amendments, and various independent SEDUE initiatives that EPA plans to support technically.

1983 U.S.-Mexico Border Environmental Agreement

Annex IV to the 1983 Agreement, signed on January 29, 1987, requires copper smelters in the border area of Arizona, New Mexico, Texas, and Sonora, Mexico operating as of January 29, 1987, to comply with certain emissions limits that are not stricter than U.S. New Source Performance Standards (NSPS). The Annex contains an annual reporting requirement and provides for the transfer of emissions and compliance monitoring data between SEDUE and EPA.

Annex V to the 1983 Agreement, signed on October 3, 1989, provides for a quantitative appraisal of causes of, and potential remedies for, urban air pollution problems in Mexico-U.S. border cities identified as "study areas." Under Annex V, for each study area, SEDUE and EPA will compile emissions inventories (including major stationary, mobile, and area sources), estimate requirements needed to attain control levels, conduct ambient air quality monitoring, and perform air modeling analysis to evaluate air quality changes that would result from airshed-wide emissions reductions. The first study area to be identified under Annex V is Ciudad Juarez, Chihuahua-El Paso, Texas. Tijuana-San Diego and Mexicali-Imperial County, California are currently being added as study areas.

The data and analyses derived from the implementation of Annex V will provide the necessary factual basis for the design of comprehensive air pollution reduction strategies in all the study areas.

Integrated Border Environmental Plan

The Border Plan is a comprehensive border environmental strategy document that has been jointly developed by the U.S. and Mexico. The agreed Border Plan contains significant air quality improvement measures that both countries are likely to endorse. The Border Plan focuses on two distinct types of air problems -- the most serious geographically oriented problems (Juarez-El Paso, Mexicali-Imperial County, and Tijuana-San Diego) and an industrial control initiative (to pinpoint the worst-polluting industries and evoke pollution reductions from these individually and quickly).

Aspects of the Juarez-El Paso studies include the following:

(1) continue long-term air and meteorological monitoring throughout Juarez-El Paso (1991-1994)

(2) perform additional short-term field studies as required (including Summer 1991 Juarez hydrocarbon monitoring) (1991-1993)

(3) identify air modeling techniques and wind models to be used (1992)

(4) complete a refined air emission inventory for Juarez, including stationary, area, and mobile sources, facilitated by a study of Juarez VMT (1993)

(5) develop realistic control strategy scenarios for evaluation, based upon refined emissions estimates (1992-1994)

(6) SEDUE will establish a vehicular I/M program in Juarez with assistance from EPA (1991)

(7) execute models to evaluate the selected control scenarios (1994)

(8) disseminate the project's technical results to Mexico and U.S. policy-makers at the local, State, and Federal levels (1994)

(9) complete a report comparing and contrasting the current responsibilities, operational procedures, and funding mechanisms/levels of the Mexican and U.S. air pollution control agencies that play a role in regulating air quality in Juarez/El Paso (1993)

(10) prepare a report detailing the principal organizations (including non-governmental organizations) and individuals involved in making public policy in Ciudad Juarez and El Paso as well as the social and political framework within which these groups and individuals operate (1993)

(11) conduct follow-up meetings (arranged during the bilateral discussions by the Juarez-El Paso policy-makers) to encourage harmonization of the air regulatory programs throughout Juarez-El Paso (1993)

Aspects of the Mexicali-Imperial County studies include the following:

(1) convene a study team composed of representatives from air pollution agencies in Mexico and the U.S. to refine the study plan and identify resources for the proposed study; appoint a

principal investigator to coordinate various aspects of the study (1991)

(2) estimate the spatial and temporal distribution of PM-10 concentrations in Mexicali and Imperial County (1993)

(3) apportion PM-10 concentrations to source emissions (1993)

(4) estimate cross-border fluxes of PM-10 (1993)

(5) finalize control strategy (1993-1994)

(6) implement control strategy (1994)

Aspects of the Tijuana-San Diego studies include the following:

(1) create the infrastructure required to evaluate air quality in the City of Tijuana, complementing the information provided by the station at Mesa de Otay, which is operated by the San Diego Air Pollution Control District (1991-1994)

(2) establish a local working group whose sole responsibility would be the task of evaluating air quality in Tijuana (1991)

(3) establish a similar working group for the cooperative enforcement and control of emission sources (to work in coordination with its U.S. counterparts (1991)

(4) establish a program for training a SEDUE working group in different aspects of the program (1991)

(5) develop and promote a phased approach I/M program (1991)

(6) implement phase 1 (pilot program and start-up) of the I/M program (1992)

(7) implement phase 2 (full fleet program) of the I/M program (1992-1995)

The second distinct type of air problem addressed in the Border Plan is the industrial control initiative. A multi-media project, this will emphasize EPA-SEDUE cooperation to identify the most onerous industrial polluters all along the border by means of emission inventory checks, compliance investigations, and source-oriented ambient monitoring. Voluntary as well as

regulation-enforced emission reductions will be sought of these sources.

The Border Plan also sets out other air emissions research priorities. The sister cities of Nogales/Nogales and Agua Prieta/ Douglas are currently exceeding the NAAQS for PM-10. Additional ambient air and meteorological monitoring and sampling is needed in Matamoros/Brownsville, Nuevo Laredo/Laredo, and Reynosa/McAllen. There is also a need to study visibility problems in Big Bend and Guadalupe/Carlsbad, as well as southwest New Mexico (a requirement to do such in included in Section 809 of the 1990 Clean Air Act Amendments). Little information beyond routine PM-10 compliance monitoring is currently available. With the expected increase in the number of industrial facilities in the border area and resulting growth in population and vehicle use, baseline air quality data in the border area should be generated to provide an adequate basis from which to make recommendations and develop the required strategies for control.

1990 Clean Air Act Amendments

The Clean Air Act Amendments of 1970 required EPA to establish National Ambient Air Quality Standards (NAAQS) for six pollutants - carbon monoxide, hydrocarbons, nitrogen dioxide, photochemical oxidants, sulfur oxides, and total suspended particulates. (The lead standard was promulgated in 1978, the photochemical oxidants standard was changed to the ozone standard in 1979, and the hydrocarbon standard was rescinded in 1983.) The Act distinguished between primary standards, which are designed to protect public health, and secondary standards which are designed to protect public welfare. the 1970 Amendments also established emission standards for new motor vehicles; required states to develop state implementation plans (SIPs) to demonstrate how urban areas that exceed standards intended to attain and maintain the NAAQS; and provided for inclusion of transportation control measures in the SIPs.

The Clean Air act Amendments of 1977 provided for coordination of air quality planning with regional transportation planning. The 1977 Amendments also required nonattainment areas to prepare revised SIPs for areas with continued ozone, carbon monoxide, and particulate matter problems. The Clean Air Amendments of 1990 made substantial revisions to the requirements for plans to improve air quality.

As Table 1 illustrates, there are numerous PM-10 nonattainment areas in the American border region. All these areas are "moderate" PM-10 nonattainment areas and as such must implement EPA-defined "Reasonably Available Control Measures" (RACM) for all major stationary and area

sources. Additionally, these areas must perform a detailed demonstration that these measures, and others as required, are sufficient to attain and maintain the American NAAQS for PM-10.

For San Diego and El Paso, both nonattainment for ozone (O3) and carbon monoxide (CO), there are a number of requirements. These include the following:

(1) achieve annual VOC emissions reductions of three percent per year after the first six years, with compliance measured every three years as part of the ozone control strategy

(2) install reasonably available control technology on existing stationary sources emitting in excess of 25 tons per year (San Diego) of VOCs and nitrogen oxides (50 tons per year for El Paso)

(3) implement a construction permit program for new stationary sources for VOC and NOx requiring the lowest achievable emission rate and offsetting emissions reductions from other sources by a ration of 1.3 to 1 (San Diego; 1.2 to 1 for El Paso); implement an operating permits program for these new stationary sources (1993)

(4) implement control measures such as hose and nozzle controls on gas pumps to capture fuel vapors, "enhanced" I/M programs, tighter tailpipe emission controls (1994), and clean fuels programs (1994)

(5) develop transportation control measures, such as carpooling programs, driving restrictions, and high occupancy vehicle lanes, if they are needed (1993)

(6) establish an oxygenated fuels program (1992-1993)

(7) require maximum achievable control technology (MACT) on plants that are major sources of air toxics (plants with the potential to emit at least 10 tons per year of any one of the 189 toxic air pollutants listed in the Clean Air Act Amendments of 1990) (1994)

(8) require preparation and implementation of risk management plans by facilities where a regulated substance is present in more than a threshold quantity; the plan is to provide for prevention and detection of releases and emergency response (1993)

(9) apply EPA's NSPS to control air emissions from municipal, hospital, and other commercial and industrial incinerators (1991)

Additional requirements for San Diego (under the California Clean Air Act) include the following:

(1) ensure that there are no net increases in emissions from new or modified sources (1992)

(2) require installation of best available retrofit technology (1993-1994)

(3) control heavy-duty truck traffic during commute hours (1992-1993)

(4) comply with the following statewide emission control measures: clean fuels and low-emission vehicles; reformulated gasoline; heavy-duty diesel smoke enforcement program; and emissions reductions from construction and farm equipment, locomotives, marine vessels, off-road motorcycles, off-highway vehicles, and utility engines (1992-1994)

Additionally, section 815 of the Clean Air Act Amendments of 1990 (CAAA), which remains in force until July 1, 1995, authorizes the EPA Administrator, in conjunction with the U.S. Department of State and affected border states, to agree upon a cooperative program with Mexico to monitor and improve air quality within the border area. Section 815 provides, among other things, for establishing air quality monitoring and remediation programs, annual progress reports to Congress, funding and personnel staffing.

Monitoring components include ambient air quality monitoring programs, emissions inventory development and collection of additional monitoring data to support state-of-the-art mathematical modeling studies. The ultimate goal of these programs will be to collect and produce data projecting the level of emissions reductions necessary in both Mexico and the U.S. to attain both primary and secondary NAAQS and other air quality goals in areas within the U.S. along the Mexican border. The EPA Administrator is authorized to negotiate with appropriate Mexican representatives to develop joint remediation measures for reducing airborne pollutant levels to achieve and maintain air quality standards and goals. This remediation program will also identify those control measures to be implemented by Mexico with the help of material or financial assistance from the U.S.

Under Section 815 of the CAAA, the EPA Administrator is required to report annually to Congress on the progress

of the program in bringing nonattainment areas along the border into full compliance with the NAAQS. These reports will include funding recommendations for monitoring and remediation efforts.

Section 818 of the CAAA amends the statute governing State Implementation Plans (SIPs) in international border areas. Among other things, it provides that if a state can demonstrate that the SIP would be adequate to attain and maintain the relevant NAAQS by the specified attainment date except for emissions emanating from outside the U.S., EPA should approve the SIP provided it meets all applicable requirements other than the NAAQS attainment and maintenance.

Independent SEDUE Initiatives

Such initiatives are internal, SEDUE projects that may or may not be shared with EPA before implementation. One past project that yielded PM-10 reductions in Juarez was the conversion of the Juarez municipal dump into a secured landfill; this succeeded in reducing the frequency of fires and entrainment of large quantities of particulates into the airshed.

Current SEDUE initiatives that have been recently discussed with EPA include the initiation of I/M programs in Juarez and Tijuana for fleet and government vehicles and the retrofitting of existing brick manufacturing facilities in Juarez to burn natural gas. Quantification of the beneficial effects of these latter two programs is incomplete.

e. Recommendations for NAFTA Negotiators

EPA is currently evaluating the legal constraints, policy implications, and programmatic limitations of international emission offsets or credits in the U.S.-Mexico border area. If it is determined that current U.S. law would allow these international emission offsets or credits, an industry planning to locate in the U.S. could obtain emission credits from an existing facility in Mexico (which may be switching to a cleaner fuel or otherwise reducing its emissions); these emission credits would be used to offset the increase in pollutant emissions in the U.S., and thereby allow construction under U.S. federal permitting requirements. With the proviso that any application must await a final legal determination, U.S. negotiators should raise the concept of these emission offsets or credits with their counterparts.

f. Summary

The current U.S.-Mexico border air quality situation varies from good to poor. Cooperative EPA-SEDUE projects, supported by states and cities along the border, are already studying ways to improve air quality there. The NAFTA will mean increased industrialization, along with increased commercial, residential, and vehicular activity. However, it is estimated that border area air emissions in Mexico with a NAFTA may be less than those without a NAFTA by eight to ten years following enactment of NAFTA. U.S. air emissions in the border area during the same time period will probably be about the same without a NAFTA as with a NAFTA. With NAFTA, several mitigation options exist to effect significant air emission reductions, including provisions of the 1983 U.S.-Mexico Border Environmental Agreement (Annexes IV and V), the Border Plan, the 1990 Clean Air Act Amendments, and various, independent SEDUE initiatives. NAFTA negotiators should be aware of several opportunities to promote discrete actions for improvement in air quality in both countries.

3. Water Quality

a. Issues

General

Growth in the U.S./Mexico border area and the availability and quality of water are, to some degree, interrelated. In the dry southwest, water limitations can affect development long before land limitations are approached. However, the absolute limits on development can be pushed back by water conservation practices, improved reuse technologies, and a willingness to adapt to the discomfort or inconvenience of decreased availability.

Growth and Surface Water and Groundwater Supplies

Availability of drinking water is more an issue of water quantity and less an issue of quality. However, lack of local financing capacity could result in drinking water quality issues, particularly in rural or disadvantaged areas. Limits on drinking water availability will likely be a factor in determining the location and amount of economic development and settlement. The adverse impacts of this factor can be mitigated to some degree by responsible development. Existing water supply problems in some instances stem from development practices which did not include any provision for adequate water service. Also, protection of private wells is an issue because improperly constructed shallow wells are at considerable

risk of contamination where public systems are not in place.

Water Quality and Wastewater Management

Water quality regulation is an issue because it can affect availability of surface water. That is, as the assimilative capacity of a stream is used up, the only existing mechanism that enables the standards to continue to be met is to limit the total amount of a pollutant discharged into the waterbody. New or additional discharges of pollutants cannot exceed water quality standards.

Wastewater disposal methods are an issue because they have an effect on health and the environment. Wastewater treatment plant effluent quality and quantity will affect the health of downstream surface water users and the in-stream environment. Groundwater may be adversely affected by wastewater land application or lagooning (nitrate is a particular concern) and by solid waste disposal facilities. There are instances in the border area where development practices did not include provision for adequate wastewater collection and treatment service.

Ecosystem, Wildlife Habitat and Coastal Area Changes

Watershed and wetlands protection will be affected by growth. Since development generally follows water supply, the most attractive land is near streamflow, not infrequently in wetlands. Growth could potentially have an adverse effect on local ecosystems and wildlife habitats.

The coastal waters environment will be affected by development in the vicinity of San Diego Bay and near the Gulf of Mexico at Brownsville. The level of coastal waters impact will be determined in part by the volume of shipping and the regulation of vessel discharges. Development in the coastal areas in direct support of shipping and indirectly through enhanced employment opportunities will have a bearing on the coastal biota.

b. Background

General

The border between the U.S. and Mexico extends for nearly 2,000 miles from the Pacific Ocean to the Gulf of Mexico. Dry desert conditions exist over most of the border area with the exception of the fifty miles of border along the lower Rio Grande.

Most of the border area is sparsely populated. Its inhabitants live mainly in a number of "sister cities" across the border from each other. San Diego/Tijuana has a combined population of approximately two and one-half million while El Paso/Ciudad Juarez has a combined population of over one million people. Four other sister cities (Imperial County/Calexico, Nogales/Nogales, Laredo/Nuevo Laredo and Brownsville/Matamoros) have combined populations of over 200,000 each. It appears that the total population of the border area is in excess of five million.

The population of major "sister cities" in the border area has grown rapidly in recent years, increasing from 3.3 million in 1980 to 4.7 million in 1990. According to census data, the smaller city in most sister city pairs, which is generally on the U.S. side, experienced more relative growth from 1970 to 1980, creating severe pressures on infrastructure. Population growth in the border area has paralleled the expansion of the industrial base of the border cities.

Surface Water and Groundwater

Most of the larger communities along the U.S./Mexico border obtain their drinking water from surface supplies, including the Rio Grande and Colorado Rivers. Growth may naturally be constrained in communities that are already dependent on limited groundwater supplies. Even then, water quality is often poor due to natural minerals and gets worse with greater withdrawals. Aquifers provide base flows to the streams, so aquifer depletion can significantly impact surface and groundwater supplies. Rural areas and private domestic wells are unlikely to draw sufficient quantities of water to cause aquifer depletion. However, significant agricultural or other industrial development using groundwater supplies at rates greater than aquifer recharge in the border area could lead to depletion of groundwater reserves.

The U.S. and Mexico are concerned about the adverse public health and environmental impacts caused by pollution of transboundary drinking water supplies in the border area. This decline in water quality will probably result in a demand for additional investment in water treatment plant capacity. The International Boundary and Water Commission (IBWC) has the lead role for undertaking water sanitation measures and water related works mutually agreed to by the U.S. and Mexico, including conducting water quality monitoring.

As industry and other sectors of the economy in the border cities have grown, the added economic activity and attendant population increases have produced substantial

strain on the border area's infrastructure. Extensive Federal, state and local investment in water supply and treatment and other public works has occurred in conjunction with the recent economic growth in the U.S. border counties. Controls such as urban zoning and provision of a wide range of public services on the U.S. side of the border area have mitigated many of the potentially negative impacts of this rapid growth.

Rural, unincorporated subdivisions in U.S. border counties, called "colonias", often have substandard or nonexistent water and sewer facilities. The General Accounting Office estimates that in Texas and New Mexico over 200,000 residents live in such colonias. About 60 percent of the Texas colonias and about 80 percent of the New Mexico colonias have water service. In colonias without public water systems, residents typically use shallow wells that can be potentially contaminated from private septic systems. Often the residents obtain water from a yard tap or common tap which serves several residences, and human waste is disposed of in private pits.

Both Texas and New Mexico have funding programs for water and sewer development needs in the colonias. Texas recently authorized a $100 million bond issue for water and sewer system projects in economically distressed counties and in all counties adjacent to the Mexican border, which will include the colonias.

The EPA Fiscal Year 1990 Appropriation Act allocated $15 million for establishing a special revolving fund (SRF) for loans in the colonias of 12 Texas counties. This colonias SRF will fund sewage treatment needs.

Water Quality and Wastewater

There are two basic U.S. approaches to water pollution control. The first is the technology-based approach with discharge limits established by EPA for specific industries nationwide (effluent limits). The second is water quality standards in which uses and criteria (safe limits for specific pollutants) are set by the states for each surface waterbody. They are subject to review by EPA. Applicable water quality standards for a water-quality-limited water body may require dischargers to provide greater treatment to achieve the water quality goals set by the standards than that necessary to achieve the technologically-based limits.

The uses of a waterbody, such as water supply, swimming, fishing, fish propagation, industrial and agricultural uses can be adjusted. The water quality criteria component of a standard may also be adjusted for individual waterbodies to reflect the differences caused by

water chemistry in the impact a pollutant may have on the aquatic biota or by considering the physical, chemical, biological, and economic factors involved and setting standards that can reasonably be attained.

However, in some areas of the border, the waters that cross the boundary or that are tributary to the international rivers, present unacceptable sanitary conditions attributed to the disposal of wastewater in these watercourses. There is the related risk of pollution of transboundary ground waters if proper management and treatment of surface wastewater is not carried out.

Currently, San Diego wastewater is treated to an advanced primary level, and the City and EPA are discussing upgrading treatment to secondary level before ocean discharge, three and one-half miles from shore. The Tijuana wastewater collection system cannot convey and treat all of the wastewater generated, which results in some raw wastewater from Tijuana flowing across the border into San Diego. Since the 1960's, the City of San Diego has treated City of Tijuana wastewater whenever necessary. In October 1991 a wastewater diversion project was completed at the Tijuana River to redirect the daily flow of 13 million gallons of sewage from Tijuana to San Diego's existing wastewater treatment project. This interim project is aimed at addressing the region's wastewater treatment demands until a planned U.S.-Mexico 25 million-gallon-a-day facility is completed in 1995. The Government of Mexico has constructed a pumping station, pressure line, conveyance channel and treatment plant for Tijuana, which at present are functioning properly. Section 510 of the Clean Water Act amendments of 1987 provides an authorization for the U.S. to participate in the cost of an international wastewater treatment facility for the excess wastewater flowing from Tijuana.

The New River, originating south of Mexicali, flows north carrying both raw and partially treated domestic wastewater, industrial wastes and agricultural wastes into California where additional agricultural runoff enters the river. The Mexicali wastewater system is insufficient for all of the wastewater generated in that city, resulting in transboundary contaminated flows in the New River. While a large part of Mexicali's wastewater is treated, the effluent is discharged into the New River without disinfection. The remaining wastewater flows without treatment to the New River or drainage tributaries. Industrial wastes from several areas of Mexicali also discharge into drains that empty into the New River. Other discharges into the New River include untreated industrial wastewater, waste from pigpens, and drainage from the open-air municipal solid waste dump. To resolve these problems, Mexicali has installed wastewater treatment systems in some of the factories, relocated the pigpens so their discharge

does not affect the river, relocated the municipal solid waste dump, and improved the municipal collection system.

The wastewaters of both Nogales' are treated in an international treatment plant jointly funded by the U.S. and Mexico, located north of the border. Surface water assessments by the State of Arizona since the 1970's indicate that surface water in Nogales has been contaminated intermittently with fecal coliform, and there is possibly industrial and inorganic waste contamination. Chlorination in Mexico and facilities for pumping Nogales wastewater in the U.S. were constructed to control fecal coliform counts under Arizona standards.

Effluent from El Paso's three wastewater treatment plants that discharge to the Rio Grande are treated to secondary levels with disinfection.

Municipal wastewater in Laredo, Texas, is treated by wastewater treatment facilities and complies with water quality regulations for total suspended solids and biochemical oxygen demand (BOD). A combined flow of 25 mgd of untreated wastewater from Nuevo Laredo will be conveyed by an improved collection system and treated to standards agreed to by the two governments in a jointly-funded international treatment plant located on the Mexico side of the border.

One of the City of Brownsville's treatment plants discharges secondary treated and disinfected effluent into the Rio Grande. Other U.S. border communities discharge into interior drainage systems away from the river.

Of the Texas colonias, less than 1 percent have wastewater collection and treatment systems. In New Mexico, 7 percent have sewer systems. In colonias without sewers, residents typically use septic tanks and privies which do not meet public health standards and which can degrade groundwater.

Ecosystems, Wildlife Habitats and Coastal Areas

Estuaries and wetlands are a critical natural resource providing great economic, public health and ecological benefits. These include fish spawning grounds and nurseries, food chain production essentials, feeding and breeding habitats for wildlife, stormwater storage for flood reduction, stabilizing of shorelines, stemming nonpoint source pollution by trapping sediments and pollutants, important recreational opportunities and commercial fishing. Over the long term, ecological degradation either directly or indirectly degrades human health and the economy. Two instances of this in the

border area are the lower Rio Grande Valley and the San Diego area.

The lower Rio Grande Valley is home to one of the most unusual ecosystems in the United States. Only about five percent of the original subtropical forest remains, having been lost to agriculture and vacation homes. The forest is scattered along the Rio Grande River constituting 11 distinct habitats for a wide diversity of plants and animals. Portions of these habitats are protected as part of the lower Rio Grande National Wildlife Refuge. Conservation organizations and private citizens are engaged in an effort to piece together at least 250,000 acres to form a Wildlife Corridor stretching from the river's mouth in the Gulf of Mexico to Falcon Dam, about 200 miles upstream. The Chihuahuan Thorn Forest, which ranks fifth nationally as a unique and threatened ecosystem,is located along the river near the dam.

Natural habitats in and around San Diego Bay have been greatly altered and reduced during the last 100 years. Nearly 90 percent of the salt marshes and 50 percent of the mudflats have been lost due to filling. Virtually all of the upland habitat has been converted to urban and industrial uses. Most shoreline development sits on fill. The Bay today is much deeper and narrower than it once was, and only the South Bay has significant areas of marsh, mudflats and salt ponds. Freshwater inflow has been diminished by dam construction, extensive groundwater use, diversion of the San Diego River, and prolonged drought. The remaining subtidal, intertidal, and salt pond habitats are vitally important to fish and wildlife resources. The Bay supports an impressive number of species, including five endangered species, over 100 species of water fowl and shorebirds, and 90 species of fish and shellfish. The mudflats of the South Bay are a significant stopover for shorebirds of the Pacific Flyway. In the 1940's and 1950's, San Diego Bay became highly degraded by wastewater discharges. Improved water quality has now allowed the Bay to become a significant recreational resource, which is a substantial source of income for the San Diego area. The San Diego Bay Cleanup Project, Initiated in 1985, has resulted in the characterization of Bay water quality problems, and ongoing work of Federal and state agencies has added to the level of knowledge regarding the principal problems of the Bay: contaminated sediments, nonpoint source pollution, and habitat degradation. The Tijuana River National Estuarine Reserve marshland will be a beneficiary of the planned international wastewater treatment facility to be located at its upstream edge with its outfall by-passing the reserve.

c. Possible Environmental Effects of the NAFTA

General Discussion of Border Area Effects

The consideration of possible environmental effects of the NAFTA is centered around projections of growth of population and industry with and without the Agreement. The effect of growth on water quality is focused on limited availability of ground and surface water and waste assimilation capacity of water bodies. The current conditions concerning the effects on public health from poor water quality would be exacerbated by an increased rate of growth along the U.S./Mexico border. All current cooperative activities, whether in the planning or implementation stage, are working to address the backlog of current needs. Growth, since it will result in an increase in current demand, must be addressed later or in concert with meeting current needs.

Population and industrial/manufacturing growth will create the need for new roads, bridges, housing and all the requisite infrastructure including new and expanded water and wastewater facilities to support such growth and development. This growth and development will have substantial effects, especially given the fragile (or already degraded) nature of most of the ecosystems in the water-short desert areas. On the other hand, full implementation of treaties and agreements already in place between the U.S. and Mexico will contribute to mitigating some of the effects of development.

According to the EPA-SEDUE Integrated Environmental Plan for the Mexican-U.S. Border Area (IBEP), population growth in the major U.S. border cities over the last ten years has averaged over 5 percent annually. This could be attributed in part to quality-of-life and climatic conditions, particularly among those of retirement age. U.S. employment growth in the border area has averaged closer to 4 percent over the same period. Significant U.S. employment in the border area is in production facilities closely related the Mexico maquila facilities. It is expected that the question of direct discharges from maquiladora plants will be addressed in the assessment of impacts in Mexico currently being prepared by SEDUE. This economic activity and attendant population growth has added to the strain on the border area's infrastructure.

As discussed in Section III.A., alternative scenarios of future growth were considered: scenario 1 of increased growth from NAFTA principally in the Mexico interior, scenario 2 of NAFTA-related growth concentrated along the border, and growth without NAFTA. Under all scenarios, any mitigation of the impact of growth on current water quality and quantity conditions will be dependent upon the integrated management of resources across all levels of

government and sustainable growth strategies. This management will require the allocation of environmental and institutional resources for protection, conservation and sustainable multiple use of resources (ecosystems, wildlife and its habitats, and water) for these purposes.

The 5-15 percent growth projection without NAFTA and the Scenario 1 projection of 6-17 percent would place a relatively higher demand on already scarce resources. Scenario 2 would provide some mitigation on water quality and quantity issues, since it lowers the projected rate of growth along the border to the previously mentioned 4-13 percent per year. Implementation of the treaties and agreements already in place will provide some mitigation under both scenarios. However, without NAFTA the cooperation between the U.S. and Mexico in providing and regulating water quality-related facilities would possibly level out or there might be difficulty is sustaining the current level.

Surface Water and Groundwater Availability Trends

Surface water supplies are apportioned by the IBWC under the Water Treaty for the Rio Grande and Colorado Rivers. Surface water supplies will remain the principal source for major new demands in the large population centers. Since development depends to some degree on water availability, since water is limited in the border area, and since surface water is controlled by the IBWC and (in the U.S.) by water laws in western states, there are physical limits to population growth that are imposed by the relative scarcity of water. It is probable that water limitations are a control and that any impact of NAFTA on population growth and on surface water demands would be tempered by these limitations. However, the potential for improved technology, water conservation and other factors makes the absolute limit on growth due to water limitations quantitatively difficult to predict.

Groundwater, although somewhat quality-limited, should suffice to support rural and private domestic wells for residential needs. Increased industry in the groundwater-using areas, (including some maquiladoras) could put a demand on groundwater supplies which would potentially result in mining the aquifers.

All the scenarios indicate that capacity increases in water supply facilities will be needed on the U.S. side. Responsibility for construction and operation of water supply facilities is traditionally that of municipal governments.

Without NAFTA, limits to water availability exist. Development will depend on market conditions. If

industrial facilities wish to expand, water treatment facilities may be constructed to meet demand with resulting increases in costs.

Scenario 1 would result in significant demand for water supply facilities which could only be met through more sophisticated technology with attendant cost increases. The lower growth estimates in Scenario 2 would reduce the demand for water supply facilities related to border growth, but current new facility construction schedules are generally related primarily to meeting current needs.

Water Quality and Wastewater Management Trends

A balance between maintaining water quality and water use will need to be sustained with any increase in water demand. Quality water for reuse (such as wastewater treatment plant effluent and agricultural or other runoff) will become more critical. Water quality will be monitored more closely. Wastewater must be treated to a greater degree and safeguarded for beneficial use.

The growth limitation factor of water availability will drive increased wastewater management and greater regulation of water quality. Reclamation and reuse can be expected to increase. Because water demand and wastewater management go hand-in-hand, it is difficult to separate the need for additional wastewater treatment capacity resulting from NAFTA from the needs in support of meeting existing backlogged demand.

The potential cost effects of increased wastewater management, water quality monitoring and controls are also a factor in the economics of increased water demand.

Reliance on international wastewater treatment plants may increase since it is difficult to contain the environmental impacts of transboundary flows of surface and groundwater. The transborder problem can move across borders based on the site specific geographic and hydrological conditions.

In several sister city areas efforts are underway to develop industrial wastewater treatment facilities. In the San Diego/Tijuana area, an international wastewater treatment plant is under design and some preliminary construction is taking place. Planning for growth in the New River/Mexicali region as an expanded port of entry has started. A possible international project for the New River area is in the early discussion stage, as is one in the Laredo/Nuevo Laredo area. An international plant exists in Nogales and discussions are in progress for an expansion to meet increasing needs. The Brownsville/

Matamoros area is also being considered for further cooperative activities. Several sister cities are not far enough along in their planning about wastewater management to offer specific proposals.

As discussed earlier current cooperation activities involve catching up with the backlog of current needs. Any additional growth will add to those needs, and the severity of the problem will depend on the level of growth and the rate at which cooperative activities are implemented. Without NAFTA, current U.S. trends would continue and current mitigation conditions would exist. Under Scenario 1, U.S. water quality violations would increase relative to other scenarios until construction catches up with current backlogged demand and growth. The U.S. permits/enforcement system and access to financial capital will drive the construction demand. Under Scenario 2, planning for cooperative activities that has begun and ongoing construction will be utilized. This would put the least stress on current activities and planning and activities primarily directed toward backlogged demand would proceed as long-range plans indicate.

Ecosystem, Wildlife Habitat and Coastal Area Trends

The lower Rio Grande Valley area is already experiencing problems with the discharge of wastewater into the river and into lagoons that eventually affect the river and the habitats in this area. Growth and development in this area, if not carefully planned and implemented, will result in further loss and degradation of habitats and the biodiversity of these ecosystems.

Many Federal, state, local and private agencies or organizations are continuing to invest a high level of resources into cleaning up and preserving San Diego Bay. Already the subject of heavy population increases, the area will face almost insurmountable burdens and costs from further potential growth and development.

Again, the impact on the lower Rio Grande valley and perhaps to a greater degree on the San Diego area results from factors other than the existence of a NAFTA. This is not to minimize the fact that significant growth for other reasons is expected and should be dealt with by the appropriate regulatory agencies.

Without NAFTA, problems with the discharge of wastewater in the lower Rio Grande Valley and San Diego Bay ecosystem degradation will demand attention and further planning effort. Under Scenario 1, development would make already bad conditions worse. Significant time and resources would need to be dedicated to mitigation. Scenario 2 could mitigate these effects somewhat at the

border and coastal areas. However, the same planning needs to be done as without NAFTA.

General

It is probably not possible to isolate any water quality impact on the border area specifically attributable to the NAFTA. As noted above, water quality and availability problems have become a constant issue in the arid border area. Water quality will be an important border environmental issue in the years ahead regardless of the outcome of NAFTA negotiations. Adverse effects on water quality can be minimized through use of the concepts of integrated management of sources and sustainable development. This will require the allocation of environmental and institutional resources for the protection, conservation and sustainable multiple use of resources (ecosystems, wildlife and their habitats, and water for these purposes). Sustainable development means not endangering the atmosphere, water resources, soil and ecosystems that support life and not compromising the ability of future generations to meet their own needs.

Population and industrial/manufacturing growth will result in the need for building new roads, bridges, housing and all the requisite infrastructure including new and expanded water and wastewater facilities to support such growth and development. This growth and development will have substantial effects, especially given the fragile (or already degraded) nature of many of the ecosystems in the water-short desert areas. On the other hand, implementation of the many treaties and agreements already in place between the U.S. and Mexico will contribute to mitigating some of the effects of development.

According to the EPA-SEDUE Integrated Environmental Plan for the Mexican-U.S.Border Area (Border Plan), population growth in the major U.S. border cities over the last ten years has averaged over 5 percent. This could be attributed in part to quality-of-life and climatic attractions, particularly among those of retirement age. U.S. employment growth in the border area has averaged closer to 4 percent over the same period.

Surface Water and Groundwater Availability Trends

Surface water supplies are apportioned by the IBWC under the Water Treaty for the Rio Grande and Colorado Rivers. Surface water supplies will remain the principal source for major new demands in the large population centers. Since development depends to some degree on water availability, since water is limited in the border area, and since surface water is controlled by the IBWC and (in

the U.S.) by western water law, the current population increase rate may not be sustainable. It is possible that any impact of NAFTA on population growth and on surface water demands may be tempered by the driving force of water limitations.

Groundwater, although somewhat limited, should suffice to support rural and private domestic wells for residential needs. Increased industry (including some maquiladoras) could put a demand on groundwater supplies which would potentially cause a threat to aquifers. Section III.A. shows industry continuing to grow, although perhaps at a slower rate.

d. Environmental Policy and Program Options

Surface Water and Groundwater Availability and Uses

The governments of the U.S. and Mexico are concerned about adverse effects on public health and the environment in the border area where transboundary ground waters may be contaminated or are threatened with contamination. The U.S. and Mexican governments are addressing the various data needs and coordination mechanisms necessary to enhance the contingency planning/emergency response capabilities of the border area.

The Border Plan indicates that the U.S. and Mexico are expected to develop an inventory of the source, quality, and treatment processes of the existing drinking water facilities of the "sister cities" by 1992. In addition, each government will determine the priority needs for water supply, treatment and distribution systems for existing and future development in the "sister cities".

The Border Plan further states that the U.S. and Mexico will be identifying any areas where the drinking water sources common to both countries are contaminated or there is an identifiable threat of contamination and will develop cooperative programs for solving identified problems under existing U.S./Mexico agreements.

State and local governments should ensure that groundwater quality protection zones, or wellhead protection, is applied as appropriate to protect limited groundwater supplies. Zoning and other institutional tools for managing growth should be used for limiting population densities. Drinking water infrastructure needs should be anticipated immediately. Maximum use of Federal regulatory authorities should be used to reduce the risks posed to drinking water from surface or groundwater sources. This could reduce the costs of treatment infrastructure and compliance costs for this region. An additional Federal or state role is necessary to address the concern about

unregulated private shallow wells. Complete data for assessing groundwater availability and potential supply impacts is lacking and information exchange needs to be a priority area.

Cooperative multimedia activities will mitigate adverse impacts. These include: development of a uniform data base to be used for risk-based management, inspections of industrial generating facilities, inspections of municipal facilities receiving industrial wastewater; joint sponsorship of industrial conferences focusing on water, hazardous waste, and emergency response/contingency planning and compliance issues; and promotion of waste minimization, source reduction and other facets of pollution prevention programs. Comprehensive groundwater programs under EPA's new groundwater strategy would help to integrate groundwater-related components of these programs.

Where water protection and pollution control facilities, such as those for handling of hazardous wastes, are lacking or inadequate, consideration should be given to developing market incentives and user charges on pollution sources to pay for such facilities.

Water Quality and Wastewater Discharge Regulation

While recognizing the sole and sovereign responsibilities of each government for law enforcement in their respective jurisdictions and territories, the U.S. and Mexico should recognize that damage to human health and the environment in the border area may be reduced through increased cooperation, and that enforcement activity is necessary to promote compliance and ensure the integrity of environmental laws and requirements.

The U.S. and Mexico are expected to develop and implement a cooperative agreement to assure compliance with all applicable regulations in order to minimize pollution from industrial sources in the border area. This includes the exchange of the full spectrum of applicable Federal and State statutes, regulations, policies and procedures.

To promote further coordination, border area Environment Round Table meetings could be established at the local, State and border area level. These Round Table meetings would provide a forum for the exchange of ideas and discussion of environmental problems and their resolution throughout the border area. They could also promote information and technology transfer among industry, environmental interest groups, local, state, national and binational environmental agencies, and provide a mechanism for participation in the environmental resource development and allocation process to fund solutions for environmental issues.

The private sector in the U.S. and Mexico should be mobilized to assist in accelerating environmentally sound development in the border area in at least the following ways: a program of voluntary pollution reductions agreed to with major firms operating in the border area and technology transfer through treatment, control, and pollution prevention technology seminars for the maquiladora and other border area industries.

Ecosystem, Wildlife Habitat and Coastal Area Regulation

The U.S. and Mexico recognize that because the problems of the border are common to both countries, a cooperative enforcement strategy between the two governments could achieve economies and convey a more effective message of deterrence. Enforcement will benefit from information exchange and publicity, including administrative and civil enforcement actions brought against border area facilities. The U.S. and Mexican governments expect to begin coordinating their activities in the border area with the other major environmental agencies active in the area which have particular expertise and experience in ecosystem, wildlife habitat and coastal area management.

e. Recommendations for NAFTA Negotiators

The priorities in developing improvements to the water environment along the border are described in the EPA-SEDUE Integrated Environmental Plan for the Mexican-U.S. Border Area (Border Plan), currently under joint development. The Border Plan is outlined in Section I and contains the following four elements in its first phase:

(1) Strengthening enforcement of existing environmental protection laws. NAFTA provisions should be consistent with the Cooperative Enforcement Strategy Working Group efforts to improve information exchange on technology, compliance, ad enforcement.

(2) Reducing pollution through new initiatives. NAFTA provisions should be consistent with increased treatment efforts, pretreatment program implementation, drinking water planning, and pollution prevention initiatives.

(3) Increasing cooperative planning, training, and education. NAFTA provisions should be consistent with increased efforts in these areas.

(4) Improving environmental databases. NAFTA provisions should be consistent development of those databases

found necessary for tracking and quantifying environmental concerns and remedial activities.

4. Control of Toxic Chemicals

a. Issue

A Free Trade Agreement (FTA) between the U.S. and Mexico would increase commerce between the two countries. Concern has been raised that such a FTA might affect the control of chemical substances.

b. Background

Statutory Framework

Commercial chemicals are regulated within the U.S. under the Toxic Substances Control Act (TSCA). TSCA provides authorities to control the manufacture, processing, distribution in commerce, use and disposal of chemicals. Examples of the kinds of chemicals covered by TSCA include, among many others, adhesives, surfactants, coatings, dyes, polymers, chemical intermediates, etc. Pesticides and drugs are excluded from TSCA authorities.

TSCA authorities allow the EPA to require testing of existing substances, review new chemical substances prior to commercial manufacture or import, control substances (alternatives range from limiting manufacture or use to a ban), gather information, and requires notification prior to export. TSCA also requires importers of chemicals to certify that the substance(s) meet the provisions of the Act.

TSCA, as well as current regulatory requirements established under the statute, apply equally to domestically-produced and imported chemical substances.

The Role of Standards, GLPs and Information in the Control of Chemical Substances

The EPA has developed detailed regulations specifying what information must be reported and who is responsible for notification, data development and submission. Testing guidelines have been developed and published which are later incorporated as test standards in rule making to facilitate the generation of health and safety data. In addition, Good Laboratory Practice (GLP) regulations have been promulgated to ensure that studies will be carried out in an acceptable manner. These regulations, standards and GLPs provide reasonable assurance that data generated are

adequate and reliable for purposes of evaluating the potential risks of chemical substances.

International Cooperation In Generation of Test Data

The Organization for Economic Cooperation and Development (OECD) has a testing guidelines program to be used by member countries when developing health and safety data. Member countries agree to accept data for the purpose of assessment which were developed by other countries if the data are generated using OECD approved test guidelines and which are in accordance with OECD-developed good laboratory practices. The U.S. is a member of OECD and has actively participated in the OECD guidelines development program and accepts data generated using test guidelines developed under TSCA or OECD guidelines. Many of the existing OECD guidelines are based on TSCA guidelines. If Mexico, or any other country, were to recommend use of a new guideline, e.g., other than approved by OECD or developed under TSCA, EPA would consider the request on its scientific merits and provide for appropriate public notice and comment. The U.S. will not in any way weaken health or safety standards.

Compliance

Compliance with TSCA is the responsibility of the Office of Compliance Monitoring under EPA's Office of Pesticides and Toxic Substances. Compliance activities include, but are not limited to, inspection of manufacturing, processing, use and disposal facilities to determine compliance with orders, rules and regulations, inspection of laboratory facilities that conduct testing required under the Act and auditing of study results. Both civil and criminal penalties can be assessed, fines range up to $25,000 per day of violation and the law provides for imprisonment for up to one year in the case of criminal violations.

c. Possible Environmental Effects of the NAFTA

All commercial chemical substances imported into the U.S., from Mexico or any other country, must comply with EPA's regulations under TSCA. This would not change under a free trade agreement. Data generated and studies conducted in Mexico, or any other country, must meet promulgated standards and must be conducted under applicable GLPs.

As described in detail in Section II.C., the Administration has made it clear that the U.S. will not agree to weaken its environmental and health laws or

regulations as part of the FTA, and the U.S. will maintain enforcement of such laws.

Given this high level of commitment and the safeguards under existing law, there should not be any increased environmental or public health risks as a result of a NAFTA.

5. Hazardous Waste

a. Issues

The NAFTA is likely to result in the acceleration of industrial growth opportunities for both the U.S. and Mexico, throughout each country and along the border. As with all economic growth, with it will come increased waste generation. New job opportunities resulting from trade-related industrial growth are expected to attract new residents to the border area. The increase in industrial activity and associated population growth is likely to result in an increased demand for solid and hazardous waste management capacity.

The particular issue with regard to hazardous management on the U.S. side of the border is whether, given 1) the increase in hazardous wastes generation in the U.S. and 2) the possibility for an increase in hazardous wastes generated in Mexico to be exported to the U.S., the existing level of effort and capacity will be adequate to provide environmental protection during the transport and subsequent management of such wastes.

b. Background

Maquiladora Program

Since 1965, nearly 1,500 industrial facilities have been established in the Mexican border region under the terms of the maquiladora program. Under this program, firms, usually from the U.S., export raw materials and partially assembled goods to production facilities located in Mexico. U.S. regulations allow the finished goods produced at the Mexican facilities to be exported into the U.S. with tariffs charged only on the value of the non-U.S. components and labor. Mexican law requires that hazardous wastes generated in the maquiladoras from U.S. raw materials be exported to the U.S. for management or be "nationalized." "Nationalization" is a process through which SEDUE, SECOFI (the Mexican Commerce Department), and Aduanas (Mexican Customs) decide that hazardous wastes can stay within the country for recycling purposes and through which import duties are paid. As of 1990, SEDUE has authorized seven hazardous waste recycling facilities.

Mexico does require maquiladoras to obtain authorization from SEDUE for waste exports, through a "guia ecologica". This "guia" is good for 90 days and one shipment. Mexico also requires a tracking form, similar to our manifest. When the waste shipment crosses the border, the Maquiladora must send a letter to SEDUE to close out the "guia".

As tariff barriers are eliminated under the NAFTA, there will be less incentive for firms to invest under the maquiladora program. Firms not in the maquiladora program would not be required to export hazardous wastes to the U.S. Therefore, the percentage of hazardous wastes generated in Mexico which would be required to be exported to the U.S. would decrease.

Hazardous wastes generated in maquiladora operations may pose significant risks to workers, the populace, and the environment if not managed properly. Typical hazardous waste types generated in maquiladora settings include acids, bases, liquids containing heavy metals, metal-plating wastes, organic solvents, and cyanide wastes. These wastes must be handled using special procedures and usually technically sophisticated treatment (which may include recycling) prior to disposal.

Hazardous Waste Management Capacity in Border States

Pursuant to the 1986 Superfund Amendments and Reauthorization Act, U.S. states are required to forecast hazardous waste generation in their states and the supply of hazardous waste management capacity. Periodically, states must submit updates of these forecasts to EPA.

Three of the four American states in the border area, Texas, New Mexico, and California, submitted 1989 Capacity Assurance Plans (CAPs) indicating that they currently have adequate management capacity for hazardous wastes generated within their borders. Arizona's CAP was withdrawn before it was approved to make adjustments necessary to reflect changes caused by delays in siting a planned hazardous waste incinerator. According to the CAPs submitted, these States anticipate having sufficient capacity to handle the wastes they generate. None of these plans consider the potential for increased demand for capacity which could result from increased industrial growth in the border area. However, as explained below, the wastes from Mexico now account for only a small portion of wastes now managed in those states.

Currently, hazardous wastes shipped from Mexican maquiladoras for management in the U.S. appear to have little effect on capacity needs. For example, EPA data from Region VI (comprising the states of Texas, Louisiana,

Arkansas, Oklahoma, and New Mexico) indicate that hazardous waste import shipments through Texas border stations grew from 9 shipments and 189.9 tons in 1987 to 356 shipments and 2388.5 tons in 1990. These wastes were shipped to treatment and disposal facilities throughout Region VI as well as other areas of the U.S. In comparison, over 66 million tons of hazardous waste were generated in Region VI states in 1987. In addition, Region IX has partial data which indicate that 750 tons and 232,500 gallons of hazardous waste were imported from Mexico into Region IX during the first eight months of 1991. These and other data collected by Regions VI and IX indicate that the amount of hazardous waste currently entering the U.S. from Mexico for treatment and disposal is so small relative to the amount generated in the states themselves that minimal impacts on management capacity in the border area (or in the remainder of the U.S.) are likely. If numbers of return shipments moving through or managed in other U.S. border states are similar to those cited above from Texas, one concludes that little, if any, effect on our national waste management capacity can be reasonably anticipated.

At the present time, however, little is known about the management of the full amount of hazardous wastes generated at the maquiladoras when the waste is not recycled in Mexico. In October 1991, in his introduction of the Mexican Integrated Environmental Border Plan, Secretary Patricio Chirinos of SEDUE announced that 31% of maquiladoras exported their wastes to the U.S. This figure is up from 14.5% previously. We have limited data on the disposition of hazardous wastes from maquiladora plants. Some contributing factors to this situation include SEDUE's limited administrative capacity to process and administer prior notifications to the U.S. and limited EPA regulatory requirements for importers. Current EPA and SEDUE activities, described below, are focusing on better characterizations of the wastes generated by maquiladoras and better tracking procedures to determine their ultimate fate.

Trends in Industrial and Population Growth in the Border Area

The number of maquiladoras is increasing in the border area, from fourteen to twenty percent annually. Maquiladoras account for almost seventy five percent of industrial employment in the Mexican border cities, and border industries accounted for two-thirds of Mexico's total gross manufactured exports for 1980.

It is not possible to fully quantify the relationship between growth of the maquiladoras in Mexico and industrial and population growth along the U.S. side of the border. However, approximately 25% of the population in the U.S.

border area falls below the poverty line. Under these conditions, should opportunities for continued economic expansion be available on the U.S. side of the border, residents can be expected to be highly supportive of such expansion. Regional employment is linked to the strength of the economy on the Mexican side of the border, since many of the border communities are dominated by trade and service industries.

Joint Efforts of the U.S. and Mexican Governments to Improve Hazardous Waste Controls in the Border Area

In recent years, EPA's Regions VI and IX have worked extensively with SEDUE officials to improve implementation of existing control mechanisms. These efforts have taken the form of joint training courses on inspecting specific types of waste management facilities, and at conducting joint visits to several industrial settings in Mexico and the U.S. State agencies have also been involved in these cooperative efforts. To assist the regulated community, EPA and SEDUE have also organized annual conferences since 1988 for maquiladora industries to help educate affected parties about existing and evolving environmental policies and regulations on both sides of the border. Participation in these activities by SEDUE personnel has been excellent, and a firm foundation has been built on which future joint activities will expand.

Region VI and SEDUE are involved in the development of a pilot computerized tracking system which would track hazardous waste movements between Mexico and the Region VI. In it planned that this pilot will lead to a complete binational tracking system, which will greatly assist tracking of hazardous wastes exported to or imported from Mexico and will greatly facilitate each country's respective enforcement efforts.

SEDUE is also working to re-license all maquiladoras located in the border region to ensure that they are complying with Mexican laws and regulations, including the requirement that hazardous wastes generated from U.S. raw materials be exported to the U.S. This effort was completed at the end of 1991.

In addition, Region VI has a project under which they are encouraging U.S. firms with plants in Mexico to abide by Mexican environmental laws and regulations, including management of hazardous wastes. Taken together, these actions will greatly increase compliance with environmental regulations and are inticipated to lead to an increase in hazardous waste imports into the U.S. from Mexico.

The U.S. is making a concerted effort with Mexico to enhance enforcement of the hazardous waste regulations

within both countries, particularly within the maquiladora system. EPA has developed hazardous waste generator and waste management guidance manuals for use in training Mexican inspectors. Joint EPA/SEDUE conferences have been held annually on the maquiladora plants and U.S. border facilities. Mexico has recently hired 100 additional environmental enforcement officials, half of which are assigned to police environmental vioaltions in the border area. Finally, the Integrated Border Environmental Plan outlines the roles and commitments of both the U.S. and Mexico for continued cooperation in enforcement of our respective hazardous waste programs.

Basel Convention

Another factor which could potentially affect waste management issues on both sides of the border in the near future is the Basel Convention. Negotiated under the auspices of the United Nations Environment Programme, the Basel Convention on the Transboundary Movement of Hazardous Wastes and Their Disposal was completed in March, 1989. Over fifty countries have signed the Convention, including the U.S., Mexico, and Canada. The Convention will enter into force ninety days after twenty signatory nations ratify it. Ratification signals a country's readiness to fully implement the Convention, including having the necessary authorities to enforce its terms. Mexico is the only NAFTA party which has ratified the Convention to date. The U.S. and Canada are both moving toward ratification, and are developing authorities necessary to implement the Convention. The Convention will enter into force May 5, 1992.

The Convention covers transboundary movements of hazardous wastes, municipal wastes, and municipal incinerator ash. When in force, the Basel Convention prohibits Parties from importing or exporting covered wastes with non-Parties, unless these countries have a separate agreement which ensures environmentally sound waste management. It specifies that government-to-government notice must be given, and consent obtained before waste exports may proceed. It also sets an "environmentally sound management" standard as the basis for all movements. If the exporting government has reason to believe the waste will not be managed in the importing country in an environmentally sound manner, then the exporting country must not allow the shipment to proceed, even if the importing country has agreed to accept it.

Many of the elements of the Basel Convention mirror features currently found in Annex III of the U.S./Mexico Bilateral Agreement. Annex III specifies conditions for movements of hazardous wastes between the countries. Hazardous waste exports from the U.S. to Mexico are limited

by Mexican Presidential Decree to those wastes which are to be recycled.

At present, the U.S. has not ratified the Convention. If and when ratified, U.S. implementing legislation will provide important new enforcement authorities to take action in cases in which environmental damages occur as a result of transboundary movements. It will also provide authority for the U.S. to control transboundary movements of municipal wastes and municipal incinerator ash, authorities which are lacking under current waste management laws.

c. Possible Effects of the NAFTA

While the current levels of hazardous waste entering the United States do not have a significant effect on capacity needs for hazardous waste management facilities in the Border Area, the NAFTA, as with any actions bringing the benefits of economic growth, could potentially increase hazardous waste generation rates in Mexico and could result in increased exports and capacity demand in the U.S. In addition, increased industrial activity on the U.S. side of the border stimulated by the NAFTA could result in increased generation of industrial and hazardous wastes in the U.S.

Increased efforts, discussed above, have also been initiated by the U.S. and Mexican governments. When the fruits of these efforts are realized, increased quantities of hazardous waste are likely to be shipped back to the United States.

There is little evidence that impacts associated with these two sources of increased demand for hazardous waste management will be absorbed solely by border area states. Although the majority of hazardous wastes exported to the United States from maquiladoras go to treatment and disposal facilities near the border, a significant amount of these wastes are managed in other regions of the country. The need for future capacity associated with these changes in the future, however, is not known. In addition, a certain amount of waste minimization efforts could be expected to occur in both the U.S. and Mexican sides of the border if the costs of hazardous waste disposal increase. This may lead to a reduced need for hazardous waste management capacity.

Finally, while the U.S. expects that the NAFTA will increase economic activity in both countries, there will be some industry sectors in the U.S. that may decline in output due to competition from firms in Mexico. Such changes could decrease hazardous waste generation rates in some industries. Many factors (business cycles, increases

in production efficiencies) affect the rates at which hazardous waste is generated.

Impacts Without NAFTA

Whether or not the Free Trade Agreement is completed, the initiatives launched by the U.S. and Mexican governments and additional plans of the governments of both countries discussed in the Border Plan indicate new controls on transboundary waste movements and additional hazardous waste movements from Mexico to the U.S. will occur. Population growth and increased industrialization could also occur without the Agreement due to assumed growth of the maquiladora industries. Therefore, hazardous waste issues requiring intergovernmental cooperation for resolution may continue to arise without the NAFTA. Such issues, however, are not expected to result in significant environmental impacts.

d. Environmental Policy and Program Options

President Bush committed to the U.S. Congress on May 1 of 1991 that the NAFTA would not be allowed to become a vehicle for reductions in environmental standards or conditions in the U.S. Activities discussed above, including enhanced tracking, inspection, and enforcement activities currently being pursued with the Mexican government, are designed explicity for the mitigation of existing and potential impacts in the border area. The Integrated Border Environmental Plan discusses the issues presented above in far greater detail. Major sister-city groups in the border area have been targeted in the Border Plan for first efforts at resolution of waste problems, based on population concentrations. Industrial source reduction is a prime goal of the Plan, and is an important first step in preventing future situations which could occur and which would require mitigation. Further, source reduction will also serve to reduce impacts on air and water quality (discussed in other Chapters of this document) in the United States.

A full Border Plan will be implemented over a twenty year period, beginning in 1992. The current draft document addresses actions called for through 1994. It is anticipated that the Border Plan will be finalized in February 1992. The reader is referred to the Border Plan for a full discussion of proposed activities. A few of the specific actions focussing on waste-related issues are listed below for illustrative purposes:

1992

- Identify universe of border facilities, including wastes generated.

- Exhange laws and regulations for translation and analysis.

- Develop routine exchanges of information.

- Conduct multimedia inspections in pairs of border cities.

- Develop and implement a training plan for SEDUE and EPA inspectors.

- Conduct the Fourth Annual Maquiladora Conference.

1993

- Continue multimedia inspections in border cities.

- Develop and deliver technology transfer seminars on pollution prevention, waste minimization, and pollution control.

- Meet with Chief Executive Officers of most environmentally significant facilities in the border area to negotiate voluntary reductions in releases and discharges.

1994

- Finalize comparative risk study of the Border area.

- Continue multimedia inspections.

- Conduct ambient monitoring to assess industrial sources.

Many of these efforts are already underway. These measures will serve to mitigate existing environmental impacts associated with waste management on the U.S. border and to preclude development of similar, new problems, and will be conducted without regard to whether NAFTA is completed.

e. Recommendations for NAFTA Negotiators

As discussed above, the Administration has stated that completion of a NAFTA between the U.S., Canada, and Mexico must not weaken existing environmental laws and regulations in the U.S. or the ability of the U.S. to enforce these regulations, provided that these regulations are based on a scientific justification or are a consequence of a level of risk the U.S. considers acceptable rather than being non-tariff barriers to free trade. The U.S. government will also maintain its rights to create additional environmental laws and regulations as appropriate.

Nothing in the NAFTA should be construed to supercede or abrogate the rights and obligations of the U.S. government in meeting the requirements of any international agreements to which the U.S. is a party, such as the U.S./Mexico bilateral agreement or any agreements which may be entered into if and when the U.S. ratifies the Basel Convention.

The U.S. government should continue to cooperate with the Governments of Mexico and Canada in the areas of data sharing, training, facility visits, and enforcement activities in order to improve the overall effectiveness of the hazardous waste programs in all three countries.

U.S. negotiators should attempt to ensure national treatment and unrestricted rights of entry in Mexico for U.S. environmental engineering, waste management, and waste minimization and pollution prevention firms and professionals as part of the investment and services negotiations.

6. Municipal Solid Waste

a. Issue

The rapid population growth in the border area in recent years has created severe pressures on available infrastructure, including municipal solid waste (MSW) services. In addition, there has been significant growth in industrial activity in the border area, with resulting increased generation of non-hazardous industrial wastes. Improper disposal or burning of non-hazardous wastes on both the U.S. and Mexican sides have created potential environmental risks in the border area. A continued or increasing rate of population growth could further exacerbate the air and water pollution problems associated with improper MSW disposal or burning.

b. Background

Municipal Solid Waste

Per capita waste generation in the border area is 1.5 pounds per person per day--this is lower than the U.S. national average of 4 pounds per person per day. This lower rate of waste generation is likely due to the lower level of affluence of the population in the area. Incomes on the Mexican side of the border are particularly low, on the order of one-tenth that on the U.S. side.

With a population in excess of 5 million in the border area, this yields a total of 9 million pounds (4,500 tons) of MSW generated per day, or 4500 tons per year. The volume and characteristics of waste have changed in recent years from typical organic residues to ones of slower degradation (i.e., plastics).

Of the total MSW generated, it is estimated that only 1800 tons/day (or 40%) are actually collected. This suggests 2700 tons/day (or close to 1 million tons per year) are disposed of improperly. About 65% of the garbage actually collected is disposed of in open air dumps (this is 1700 tons/day or 427,000 tons/year).

The open air dumps have created problems from noxious odors and air pollution resulting from the intentional and unintentional burning. In Nogales for example, open dumps may burn for days at a time and the smoke travels across the border. Also, improper disposal of wastes and open dumps in Mexico raise the potential for groundwater or surface water contamination.

The population growth on both sides of the border has resulted in unincorporated rural communities (colonias) with substandard or nonexistent housing, roads, drainage, water and sewer facilities and MSW services. Over 200,000 residents in Texas and New Mexico live in such communities. In the absence of adequate landfills, many communities have no way of disposing of wastes properly. They often dump wastes illegally. As new residential communities spring up, they also often do not have access to MSW services, further aggravating the problem of illegal dumping.

In some communities, MSW landfill capacity may become problematic in the near future. Some MSW landfills which would not meet the Subtitle D criteria are being closed before the new standards are promulgated. While some communities still have sufficient capacity for the next 10 to 15 years, others need to site new facilities much earlier.

Industrial Non-Hazardous Waste

The maquiladora program initiated by the Mexican government in 1965 has resulted in increased industrial activity in the border area. While this has likely resulted in a significant increase in the volume of non-hazardous industrial waste generation (e.g., food wastes), no information is currently available on the amount of non-hazardous industrial waste generated or how this waste is disposed.

c. Possible Effects of the NAFTA

Municipal solid waste generation is directly related to population and income levels. As noted in Section III.A above, it is difficult to forecast precisely the impact of a NAFTA on current rapid growth rates in the border area. Following implementation of a NAFTA, growth could be more rapid, or slower (as economic activity shifts to the interior) than otherwise. It is likely, however, that a NAFTA would increase income of residents in the border zones, both in the U.S. and in Mexico. A NAFTA may result in increasing population. This factor alone could result in more rapid growth in total waste generation, thus straining the existing landfill capacity in the border area. This could result in continued or increasing improper disposal or burning of MSW, creating environmental problems on both sides of the border.

Rapid industrialization in the border area also means increased generation of non-hazardous industrial wastes, which are currently not adequately tracked. It is likely that much of this waste is not being properly disposed of either due to illegal dumping, inadequate waste disposal practices, or insufficient waste disposal capacity. Unless properly controlled, increased industrialization could mean still further illegal dumping or burning of non-hazardous industrial wastes with resulting air and water pollution affecting both the Mexican and U.S. populations.

Non-hazardous waste disposal problems need to be resolved, regardless of the outcome of NAFTA negotiations. The growth in population and industrial activity in the area has already resulted in waste generation which has outstripped the ability of some communities to provide an adequate level of services.

The economic growth and governmental tax revenues anticipated with a FTA could actually provide more resources to resolve the existing and anticipated waste problems of growth anticipated with a NAFTA.

d. Environmental Policy and Program Options

SEDUE has contracted with private firms to design properly constructed landfills for municipal waste disposal in Tijuana, Mexicali and Ensenada, Baja California; Nogales and San Luis Rio Colorado, Sonora; Ciudad Juarez, Chihuahua; and Nuevo Laredo, Reynosa and Matamoros, Tamaulipas. On the U.S. side of the border, communities are identifying sites for new landfills and planning for the future.

The Border Plan focuses on four areas to address MSW concerns: assessment, public outreach, waste collection improvements, and development of additional sanitary landfills. The assessment should determine the infrastructure, regulations, and numbers/locations/types of landfills needed in the border area to mitigate public health/environmental threats associated with municipal solid waste disposal. The public outreach goal is to involve the general public in the prevention of illegal dumping and to foster pollution prevention, waste minimization and recycling.

The implementation of the assessment and public outreach goals is as follows:

- o assess the public health/environmental threat associated with municipal waste disposal in the border area (1992)
- o determine infrastructure and regulatory needs for municipal waste handling and disposal (1992)
- o determine the number, location, and types of landfills needed (1993)
- o provide training regarding site selection (1992)
- o provide training regarding facility management (1992)
- o develop an educational campaign on the detrimental effects of illegal dumping and on alternatives to illegal dumping (1992)
- o organize border recycling workshops (1993)

7. Chemical Emergencies

a. Issues

The NAFTA between the U.S. and Mexico is likely to result in an increase in industrial growth along the

U.S./Mexico border, thereby increasing the possibility of a chemical emergency.

b. Background

The U.S.-Mexico Inland Joint Response Team (Inland JRT) was established to coordinate international hazardous substance emergency preparedness and response activities related to chemical emergencies along the U.S.-Mexico border. The Inland JRT is activated in the event of a significant chemical emergency in the border area. The Inland JRT also serves as a conduit for coordination of chemical emergency preparedness, prevention, and response activities. The Team meets regularly to address standing functions.

The Inland JRT has been engaged in a number of activities since the 1983 Environment Agreement was signed by U.S. President Ronald Reagan and Mexican President Miguel de la Madrid. Members of the JRT have also been involved in several incidents which have been reported and reviewed by the standing Inland JRT.

The Inland JRT has held standing meetings annually, and more frequently when warranted, to address planning and preparedness issues. The U.S.-Mexico Joint Contingency Plan was completed and signed by representatives from both countries in January 1988. In March of 1989, the Inland JRT sponsored its first conference in San Diego. A second conference focusing more specifically on the development of emergency response plans along the border and joint response mechanisms was held in June 1990. Future conferences and workshops will build upon the efforts of these two conferences.

The Inland JRT has participated in several simulations including a table-top exercise in Calexico, California and Mexicali, Baja California in 1989. A full-field exercise was conducted in Brownsville, Texas with joint participation from Matamoros, Tamaulipas.

Local joint hazardous substances emergency plans are under development in Calexico/Mexicali, Tijuana/San Diego, and Brownsville/Matamoros.

In Matamoros, a local committee called the Local Committee for Mutual Aid (CLAM) was established in 1990. The committee is now working closely with its U.S. counterpart called the Brownsville Local Emergency Planning Committee (LEPC). Armando Mendez de la Luz of Mexico's Sistema de Proteccion Civil agreed to encourage the establishment of similar CLAMs in the other sister cities along the Mexican side of the border. Under EPA's Title

III program, LEPCs have already been established on the U.S. side.

The Inland JRT has not yet been activated for an emergency, but members of the JRT have been involved in several incidents in the past two years in Tijuana/San Diego, Brownsville/Matamoros, and El Paso/Juarez areas.

c. Possible environmental effects of the NAFTA

With the increase in trade between the U.S. and Mexico and the increase in economic growth along the border area, is likely to come an increase in the possibility of a major chemical emergency taking place in one country having an impact on areas beyond its borders. It is for this reason the Agreement Between the U.S.-Mexico Border Area Agreement was signed and the Inland JRT was born. As stated earlier, the Inland JRT was given responsibility for coordinating efforts in preparedness, mitigation, response, and prevention of hazardous substances releases along the inland border area. With the enactment of the FTA, the Inland JRTs efforts must be continually strengthened to ensure that human health and the environment are protected from potentially devastating transboundary chemical emergencies and that actions are taken to prevent those releases.

d. Environmental Policy and Program Options

In its efforts to strengthen chemical emergency preparedness and response along the border, the Inland JRT has identified several important goals for the coming years:

(1) *Develop A Joint Response Capability Along the Border.*

(2) *Improve Cross-Border Communications* through identification of communication needs including equipment and procedures.

(3) *Facilitate the Establishment of Local Planning and Preparedness Entities* using the United States' Local Emergency Planning Committees established under Title III and the local committee called the Local Committee for Mutual Aid (CLAM) established in Matamoros as examples.

(4) *Clarify Legal Authorities of Both Countries; Promote Understanding of and Compliance with Laws and Regulations* including reviewing laws and regulations and, where necessary, to develop new statutes or revise current laws and policies

focusing on issues such as who will pay for the incident response expenses, and what are the limits to liability of personnel and equipment cross-border.

(5) *Increase the Level of Preparedness, Prevention, and Response Training and Technical Assistance to Border Communities* through provision of training and technical assistance on developing plans, conducting exercise simulations, and other topics related to planning and response.

(6) *Develop Cross-Border Hazardous Materials Transportation Policy* through the analysis of the movement of hazardous substances throughout the border area.

(7) *Develop an Accident Prevention Program Focused on Facilities With Acutely Toxic Substances* which may include training and joint inspections of facilities with highly toxic hazardous substances posing greatest risk to communities.

(8) *Expand JRT Membership and Awareness of JRT* activities through identification of appropriate activities for JRT members and staff to participate in which will promote awareness of preparedness and response activities and identification of appropriate guidance materials.

e. Recommendations for NAFTA Negotiators

The U.S./Mexican Inland JRT has made significant advances over the past few years in collaborative efforts to protect human health and the environment from accidental releases of hazardous substances. With the development and implementation of the FTA and the further increase in economic and industrial growth, the activities of the Inland JRT are even more critical. With economic and industrial growth comes the increase in the possibility of a chemical emergency which may have transboundary effects. It is for this reason the Inland JRT must receive continued support for its activities. Large amounts of resources for such activities are not necessary, however, the U.S. government must remain committed to the Inland JRT efforts and private as well as public parties must be encouraged to be involved in the process. Most important is the commitment and willingness of the high level U.S. and Mexican governments to foster a working relationship that is effective and productive.

8. Wildlife and Endangered Species

a. Issue

What will be the impact of NAFTA, if any, on endangered, threatened, and candidate species and their sensitive habitats and other border area species and habitats.

b. Background

Approximately 50 threatened and endangered species and over 100 Endangered Species Act candidate species are found within the U.S.-Mexico border zone.

Listed and candidate species' habitats range from wetlands and streams, to grasslands and desert scrub, to oak woodlands and coniferous forests. Some of these habitats (particularly wetlands and streams) are rare, fragile, and extremely vulnerable to human impacts.

The increasing population on both sides of the international border (Sonora is one of the fastest growing states in Mexico) has resulted in natural resources being pushed to their maximum productivity, and in many cases, perhaps beyond the resource's ability to produce a sustainable yield. Specifically, timber harvesting (currently increasing in the Sierra Madre) and cattle grazing are two important human activities affecting the borderland environment.

The coastal wetlands and estuaries of Baja California, are unique and irreplaceable, providing habitat for five endangered species. This area is becoming increasingly popular for vacations and weekend get-aways. Resort/ condominium projects are having major impacts on the resources of this area. Industrial development is also on the increase. The ocelot and jaguarundi are examples of endangered species with populations occupying parts of both the U.S. and Mexico. On the U.S. side of the border, recovery plans require the preservation of all the remaining dense brush habitat essential to these animals' continued existence, as well as the establishment of travel corridors for the dispersal and intermixing of individuals. Agricultural and other developments tend to segment their habitat and isolate the cats, threatening the genetic exchange necessary to keep their population viable. There is a highly-funded acquisition project on the U.S. side of the lower Rio Grande Valley to establish a chain of refuges to counter the segmentation, but no equivalent measure has been undertaken in Mexico.

As noted earlier, increasing development on both sides of the border has had and will continue to have major

impacts on the quality and quantity of water resources available to this region. Groundwater withdrawal can have major impacts on springs upon which several endangered species are now dependent, while reduced stream flows and lowered groundwater levels have major impacts on upland habitats, particularly riparian habitats upon which many wildlife and aquatic species depend. Return flows from irrigation in Mexico, or from the washing of Mexican crops on either side of the border, carry significant pesticide loads into the Rio Grande. This results in the contamination of drinking water, fish, and, through reuse of river water as irrigation water downstream, the crops and soils on this side of the border.

The Rio Grande forms a physical barrier to trade not just by its restriction of international traffic, but also by its restriction on development sites. Although thoroughly dammed and levied, the Rio Grande still floods significant areas along the border, and because of flood relief routes, many thousands of acres, at some points removed from that border, lie within its floodways. Despite the potential for flood losses, the cheap price of floodplain real estate and its often strategic location near the border provide incentive for floodplain development. Often, such development is accommodated by constructing, relocating and/or elevating levees, and modifying the flood-carrying capacity of the remaining floodplain. This in turn causes the direct loss of brush habitat cleared to enhance flood flows and the indirect loss of habitat values through increased flood severity/ frequency elsewhere.

Already more than 20 bridges have been proposed between the Gulf of Mexico and Del Rio, Texas. Each bridge and its approaches destroy brush and riparian habitats along the Rio Grande; multiply human presence, lighting, noise, and air pollution; aggravate flooding; and affect the acquisition and operation of state and federal refuges, especially in the wildlife corridor Congress has funded millions to establish.

Mexico has long been an exporter of wildlife, including many species of marine and freshwater tropical fish. Although most of this trade is legal, regrettably there are also significant numbers of birds, reptiles, mammals, plants, fish, and invertebrates (dead and alive) that are illegal under the wildlife protective laws of both nations and international law (CITES). These wildlife products include threatened and endangered species of both nations, as well as non-endangered specimens, parts, and products.

The increasing international demands for rare and unique wildlife and plants continues to increase the commercial value for these products. This, coupled with

increasingly more stringent national laws which attempt to regulate and control these products, further increases the potential economic gain for illegal trade. The U.S. and Mexico are cooperating in efforts to monitor the traffic in wildlife between the two nations, although achieving adequate levels of coverage is difficult.

c. Possible Environmental Effects of the NAFTA

Development pressures may further complicate the task of protecting wildlife along the border. Reducing U.S. trade barriers for Mexican agricultural products may result in increased tillage, irrigation, and pesticide application in some crops in Mexico, while reduced Mexican barriers may increase sales of U.S. agricultural and industrial commodities in Mexico. It is possible, however, that agricultural development in both countries could contribute to the loss of wildlife habitat, further depleting surface and ground water supplies, and decreasing water quality.

Of particular concern is the Rio Grande corridor where loss of brush habitat essential for the endangered ocelot and jaguarundi is continuing. Increased industrial pollution could also inflict major impacts on the already contaminated water supply.

The coastal wetlands, inlets, and embayments of Baja California, will see increased pressure for industrial and recreational development. Without major environmental constraints, major impacts to these limited resources can be anticipated.

Pressures for additional bridges and bridge expansion would increase significantly. Not only would these facilities become more numerous, but ancillary facilities and developments, such as customs buildings, fences, highway improvements, and road-side commerce at each border crossing, would be enlarged, thus increasing individual bridge impacts beyond those experienced presently. The cumulative effects of bridge proliferation have never been subjected to analysis under the National Environmental Policy Act or the Endangered Species Act, yet are almost certain to significantly affect the Fish and Wildlife Service refuge program and projects underway to recover the endangered ocelot and jaguarundi. The wildlife corridor may be segmented and rendered non-functional unless the many anticipated bridges are addressed comprehensively.

Ground water pumping along the Arizona border adjacent to the San Bernardino/Leslie Canyon National Wildlife Refuge could have a major impact on springs originating on the refuge. Three federally listed endangered species, the Yaqui chub, Yaqui topminnow, and beautiful shiner depend on these springs as essential habitat.

d. Environmental Policy and Programs Options

It is recommended that the U.S. address the bridge problem comprehensively, conducting a careful environmental analysis to develop a uniform, coordinated approach to identify general design features for the bridges and their ancillary facilities that can coexist with refuges and endangered species along the Rio Grande. Require that future bridges should incorporate the general design features thus identified as a prerequisite to presidential authorization.

9. Health Implications of a North American Free Trade Agreement

a. Statement of the Issue

Due to the evolving nature of the proposed North American Free Trade Agreement (NAFTA), the resultant health needs and conditions for communities along the U.S.-Mexico border cannot be specified with certainty. Estimates can only be made by making certain assumptions based on economic development projections, existing health status and current capabilities of the health delivery systems.

In addressing the role of NAFTA, the health implications are based on the three scenarios mentioned earlier in the report: (1) increased border activity, with concomitant increased growth from a NAFTA, (2) slower increased growth due to more distribution of industry into the interior, and (3) growth on the border with no NAFTA.

For the purposes of these assessments, it is important to note that the geographic focus will be limited to those counties with contiguous, "sister" cities. This differs from the 100 kilometer limit of the EPA-SEDUE geographic focus. In terms of Mexican interest and participation in binational, cooperative health activities, locations beyond those "sister city" counties is of lower priority and concern.

An important area of public health concern, that extends well beyond the border area, is the potential effect of NAFTA on imported products regulated by the Food and Drug Administration (FDA), particularly fruits, vegetables and seafoods.

A persisting border health issue is the large scale movement of individuals, both ways across the border, particularly undocumented migrants. Even with the economic improvements envisioned through NAFTA, large numbers of persons from residual pockets of unemployment will continue to transit or reside in border areas in search of improved working conditions. Partially obscured by their unofficial

status, these undocumented persons will repeatedly introduce and exacerbate disease problems and avoid normal prevention and control programs. This highly mobile, but significant portion of the population, will continue to require special service delivery and funding considerations by national and local health officials in Mexico and the United States.

b. Background

The Current Situation

The U.S.-Mexico border area population is increasing faster than the overall population of the United States (Table 5). The border counties experienced a 25- to 30-percent increase in population during the 1980's, compared with a 10 percent increase for the U.S. population. Factors contributing to this rapid increase in population are high birth rates, lower age specific death rates and high in-migration.

An analysis of the demographic characteristics (Table 6) indicates that the population tends to be young, unemployed, and with a high percent of persons living below the poverty level (Table 7). The population on the border is younger than respective state and national averages. A younger population will tend to result in a higher birth rate and increase the need for maternal and child care services. An expanding population of medically indigent persons (below the poverty level) will place an increasing requirement for public resources and services.

With an open border policy, health services can not be easily restricted by citizenship. Mexican women regularly cross the border to receive obstetrical services in the United States, and there is evidence that these women account for an increasing number of births and new U.S. citizens in the contiguous border counties. There is also evidence that a large number of U.S. citizens go to Mexico for prenatal care, medical services and minor surgery, since medical care costs are less. The history of prenatal care for Mexican women giving birth on the U.S. side of the border is generally unknown and unobtainable. However, data show that birth outcomes, as measured by birth weights, are better than state averages. Despite the better prenatal outcomes of these births, many health professionals regard the provision of obstetrical services to these women as a drain on scarce U.S. health services.

It is interesting to note that, although poverty and high infant mortality are usually associated, almost all border counties experience lower infant mortality rates than the other counties in their respective states. There has been considerable discussion in medical circles about

TABLE 5
POPULATION AND DENSITY PER SQUARE MILE OF THE BORDER STATES AND COUNTIES, 1990

Jurisdiction	Population	Population Density	Percent of Population Increase Between 1980 and 1990
United States	248,709,900	70.3	9.8
California	29,760,000	190.4	25.7
San Diego	2,498,000	593.1	34.2
Imperial	109,200	26.2	18.7
Arizona	3,665,300	32.3	34.8
Yuma	106,900	19.4	37.1
Santa Cruz	29,700	24.0	45.1
Cochise	97,600	15.7	13.9
New Mexico	1,515,100	12.5	16.3
Dona Ana	135,500	35.6	40.7
Texas	16,986,500	64.8	19.4
El Paso	591,600	583.4	23.3
Val Verde	38,700	12.3	7.8
Maverick	36,400	28.3	15.9
Webb	133,200	39.6	34.2
Hidalgo	383,500	244.5	35.4
Cameron	260,100	287.1	24.0

SOURCE: 1990 Census of Population and Housing.

TABLE 6
DISTRIBUTION OF POPULATION BY AGE, 1990

Jurisdiction	Total	<1	1-4	5-14	15-24	25-44	45-64	65+
United States	248,709,873	3,945,974	14,811,673	35,095,247	37,013,289	80,595,493	46,169,302	31,078,895
California								
San Diego	2,498,016	36,181	159,157	327,393	425,035	878,975	398,135	273,140
Imperial	109,303	1,740	8,246	21,271	17,297	31,334	18,307	11,108
Arizona								
Yuma	106,895	1,582	7,505	17,657	17,071	30,386	17,845	14,849
Santa Cruz	29,676	443	2,312	5,753	4,511	8,343	5,168	3,146
Cochise	97,624	1,263	6,256	15,248	14,610	28,795	18,996	12,456
New Mexico[1]								
Dona Ana	132,000	2,299	9,478	21,007	28,118	36,176	21,007	10,716
Texas[1]								
El Paso	582,623	13,049	46,154	110,405	101,709	175,520	91,163	44,623
Val Verde	45,189	901	4,197	9,424	7,699	12,630	6,598	3,740
Maverick	41,125	863	3,685	9,647	6,527	11,251	6,295	2,857
Webb	132,772	3,276	11,655	28,028	23,026	37,620	18,701	10,466
Hidalgo	376,652	8,871	33,333	81,404	61,741	102,139	53,851	35,313
Cameron	265,343	5,877	22,843	55,956	40,281	75,075	40,147	25,164

1. Estimated Population for 1989.

SOURCE: Pan American Health Organization, United States-Mexico Border Health Statistics, December 1991.

TABLE 7
POVERTY MEASURES

Jurisdiction	1988 Per Capita Income[1]	1990 Percent Unemployment[2]	1979 Percent of Persons Below Poverty[3]
United States	12,772	5.5	11.7
California	19,369	5.6	11.4
San Diego	18,362	4.5	11.3
Imperial	13,424	19.1	15.3
Arizona	15,375	5.3	13.2
Yuma	11,491	18.2	16.0
Santa Cruz	10,726	14.6	18.1
Cochise	12,029	6.6	14.9
New Mexico	13,310	6.3	17.6
Dona Ana	10,473	6.7	22.7
Texas	15,519	6.2	14.7
El Paso	10,857	10.7	21.7
Val Verde	10,103	12.6	30.0
Maverick	6,873	26.8	39.5
Webb	8,005	10.8	33.1
Hidalgo	8,131	19.1	35.2
Cameron	8,590	11.7	31.8

1., 2. U.S. Public Health Service, Health Resources and Services Administration, Area Resource File, January 1992.
3. U.S. Department of Commerce, Bureau of the Census, County and City Databook, 1988.

the significance of the data regarding the lower infant mortality rates (IMR) along the border. Because many infants are born on the U.S. side and return to Mexico with their parents, there is a much conjecture regarding the validity of the denominator in the IMR, which some say overestimates the actual infant population. Others attribute the low IMR to the lower black population along the border which in other parts of the country contributes significantly to the higher IMR.

Migrant and seasonal farmworkers are of special concern in the border counties. These individuals have their homebase or reside in the U.S. border counties, while others temporarily come into the area from various parts of the U.S. and Mexico. The mobility of this population exacerbates the difficulty of obtaining accurate data, developing adequate planning and budgetary approaches, and implementing appropriate disease prevention and control services.

A significant public health threat resulting from increased migration to border counties is the spread of infectious disease. Maquiladoras have served as magnets for migration to the U.S.-Mexico border. The growth has outstripped capacity to provide roads, sanitation and housing for the influx of people. The result has been the development of colonias. These high- population industrialized areas are characterized by severe poverty, poor housing, crowded living conditions, environmental contamination and an absence of clean water and sanitation systems. Such conditions are fertile ground for a high incidence of infectious diseases, particularly Hepatitis, tuberculosis, measles and diarrheal diseases (Table 8).

A 1991 study on "Community and Occupation Health Impact of Maquiladora Activity in the Mexico-United States Border," by the University of Lowell Work Environment Program, notes that, "the cities weren't ready for the influx of people. There was no planning...the services stressed." It also notes that, "The community leaders commented on the myriad problems created with the influx of thousands of maquiladora workers. No systematic plan for housing, municipal services or schools was developed in preparation for the migration of maquiladora laborers and their families. While half of those interviewed think that the overall presence of maquiladoras is positive, over 60 percent think that the maquiladoras are neither responsible nor sensitive to the community's needs created by the presence of the industry."

There are also over 500 colonias along the Texas side of the border, with similar crowding and sanitation problems. It is not surprising that amebiasis, shigellosis and campylobacteriosis rates in border counties are higher than for the State of Texas. Each of these diseases is

TABLE 8
SELECTED INFECTIOUS DISEASES

Jurisdictions	Hepatitis A[1] Rates Per 100,000 Population 1990	Tuberculosis[2] Rates Per 100,000 Population 1990	Measles[1] Rates Per 100,000 Population 1990
United States	12.6	10.3	11.2
California	21.5	16.4	41.9
San Diego	30.6	13.8	47.5
Imperial	23.7	39.5	57.5
Arizona	54.0	7.5	8.5
Yuma	29.9	23.4	38.9
Santa Cruz	193.4	10.1	16.7
Cochise	29.6	4.1	42.8
New Mexico	71.3	7.5	6.0
Dona Ana	53.4	10.6	13.9
Texas	16.0	13.2	26.0
El Paso	51.6	17.9	49.6
Val Verde	23.2	23.2	0.0
Maverick	49.4	71.5	0.0
Webb	85.8	32.3	140.2
Hidalgo	27.0	32.6	19.2
Cameron	34.9	32.7	29.9

1. Morbidity and Mortality Weekly Report, Summary of Notifiable Diseases, 1990.
2. Personal Communication, Division of Tuberculosis Control, Center for Prevention Services, Centers for Disease Control, 1990.

caused by poor hygiene, polluted water, and contaminated foods. Hepatitis A, acquired through contaminated food and polluted water, was found to be twice as frequent in this border area compared with the rest of the United States. Additionally, tuberculosis is a particular problem all along the border due to the poor living conditions and high population densities which promote transmission and the high mobility of infected carriers which prevents adequate treatment with chemotherapy on both sides of the border.

Historically, the incidence of sexually transmitted diseases (STDs) have fluctuated in the border states. In 1990, the border states had higher rates of syphilis but lower rates of gonorrhea than the overall U.S. rates. The incidence of HIV/AIDS is believed to be underreported. The characteristics of the area and population in the colonias is likely to lead to increased rates of transmission. That is, the population has many young people, a high rate of unemployment and poverty, and a transient population of males without wives and families. All of these factors contribute to circumstances and behaviors which would normally increase the rates of STDs and HIV infections in communities.

Heart disease, malignant neoplasms, cerebrovascular diseases, accidents, chronic obstructive pulmonary disease, and pneumonia and influenza are the leading causes of death. This is a disease pattern typical of industrial nations. In this respect, the adult border population requires health services and resources that are not unlike those needed elsewhere in the United States. Local health officials increasingly stress the growing importance of environmental problems and their potential impact on health. Many officials fear an imminent risk of contaminating dwindling water supplies from inadequate sewage treatment and toxic waste disposal. In some cases the issues are directly binational, such as pollution of the Rio Grande, the Nogales Wash, the New River, etc. Others relate to the specific environmental problems from colonias or industries on each side of the border.

The fast-paced growth of Mexican border communities and industry in the last decade has placed an impossible burden on Mexican infrastructure, during a period of economic austerity at the national level. As a result, health and environmental services and resources, on both sides of the border are severely stressed to maintain adequate services.

Resources and Arrangements

Except for American Indians, the provision of health care in the border areas is mainly the responsibility of the individual, state and local governments and private entities. The Federal government, however, plays a major

financing and coordinating role through block grants, special project grants, and demonstration grants to State and local government and community-based organizations, as well as through Medicare and Medicaid.

Currently, the Public Health Service supports the border area through a variety of programs including grants for: primary health care; alcohol, drug abuse and mental health; maternal and child health; and prevention services. Included within these general program areas are Community/Migrant Health Centers, National Health Service Corps, Area Health Education Centers, Health Education and Training Centers, AIDS Services Projects, and other projects that support health care delivery, assistance, and the development of human and facilities resources.

The U.S. has an average ratio of 5.4 primary care physicians per 10,000 population. Except for the County of San Diego, border counties are below the national average in numbers of all types of physicians, including primary care physicians (Table 9). To alleviate the shortages of health personnel in geographic areas, there is a HHS-funded program called the National Health Service Corps. Corps assignments are based on the designation of a Health Professional Shortage Area (HPSA). The criteria rely heavily on a particular population-to-practitioner ratio of 3,5000 to 1. If an unusually high need or insufficient capacity is demonstrated, the ratio is reducible to 3,000 to 1. This determination is based on such indicators as poverty level, infant mortality rate, waiting times for health services, and visit rates. Literally every border county under discussion here falls into the HPSA category. Throughout the border counties of the four States there are about 26 assigned National Health Service Corps personnel.

Based on 1990 statistics available from the American Hospital Association, the average occupancy rate in U.S. hospitals was 69.5 percent. Lower occupancy rates for hospital beds primarily indicate an oversupply of beds or in some cases a deficit in health care workers. Eleven of the 12 border counties reviewed have occupancy rates below the national average, with a range between 44.9 and 68.8 percent (Table 10). Santa Crux County, Arizona, was the exception, with an occupancy rate of 89.6 percent. No determination can be made from the data on the need for additional hospital beds.

The Hill-Burton Legislation provided construction and renovation funds for health facilities. The hospitals, clinics, and nursing homes that received these funds are obligated to provide free health care or care at reduced costs for a period of 20 years. Approximately 22 of these facilities are located in U.S. border counties. Of these 22, about half are currently slated to complete their

TABLE 9
PHYSICIAN RESOURCES

Jurisdictions	1989 Total Physicians Per 10,000 Population[1,2]	1989 Primary Care Physicians Per 10,000 Population[1,3,4]	Designated Primary Care Health Professionals Shortage Area, 1991[5,6]
United States	20.7	5.4	
California	23.3	6.7	
San Diego	23.4	6.2	IP Area
Imperial	7.6	2.3	4P Area
Arizona	20.1	5.1	
Yuma	10.9	4.7	1P Population
Santa Cruz	7.0	3.4	1 Area
Cochise	8.0	3.9	3P Area
New Mexico	18.4	4.8	
Dona Ana	12.5	4.9	1P Area
Texas	17.9	4.5	
El Paso	13.5	3.5	1P Area
Val Verde	6.5	3.9	2 Area
Maverick	6.6	1.2	2 Area
Webb	7.7	2.9	4 Area
Hidalgo	8.0	3.4	3P Population
Cameron	10.5	3.5	4P Population

1. U.S. Public Health Service, Health Resources and Services Administration, Area Resource File, January 1992.
2. Active, Non-Federal Doctors of Medicine and Osteopathy, 1989.
3. Health United States 1987, Table 76 (States only).
4. Includes Doctors of Medicine in General Practice, Family Practice, Internal Medicine, and Podiatrics.
5. Health Resources and Services Administration, Bureau of Community Health Services, List of Designated Primary Care HPSA's, Federal Register, September 27, 1991.
6. HPSA's degree-of-shortage is scored from 1 to 4, with 1 as the highest degree of shortage; "P" indicates only part of the county is a HPSA.

TABLE 10
SHORT-STAY NON-FEDERAL HOSPITALS, BEDS AND OCCUPANCY RATES

Jurisdiction	Community Hospitals	Beds to Population Ratio (Per 100,000)	Percent Occupancy Rate in Community Hospitals
United States[1]	5,784[1]	420	69.5[2]
California	462[3]	275[3]	64.0[3]
San Diego	25	244	67.5
Imperial	3	199	56.9
Arizona	62	276	62.2
Yuma	2	244	62.6
Santa Cruz	1	246	89.6
Cochise	5	255	53.9
New Mexico	41	292	58.9
Dona Ana	1	179	68.7
Texas	442	356	56.3
El Paso	8	296	63.2
Val Verde	1	217	44.9
Maverick	1	137	68.8
Webb	2	291	68.2
Hidalgo	6	228	58.5
Cameron	5	309	59.5

1. American Hospital Association: Hospital Statistics, 1983-1986 Edition.
2. American Hospital Association, Personal Communication, January 1992.
3. U.S. Public Health Service, Health Resources and Services Administration, Area Resources File, January 1992.

obligation within the next five years. The services of these hospitals in meeting their free care obligation are monitored by the Health Resources and Services Administration. A list of border area hospitals presently obligated is shown in Table 11.

Community/Migrant Health Centers are federally funded primary care centers located in areas where medical service is insufficient. These clinics are managed by local consumer boards. In the defined border counties, there are 15 Community/Migrant Health Centers, with a total of 50 clinic sites providing primary care (medical and dental) services. Many of these centers received additional supplemental grants to address the special health care needs of populations at risk for poor health outcomes. Nine of the centers have perinatal projects to increase access of underserved pregnant women. A center in San Diego provides health care for the homeless in that community, and three of the centers (in San Diego, El Paso and Hidalgo Counties) provide early intervention services for HIV-infected people as part of a continuum of HIV prevention and care services.

In 1991, these 50 clinic sites provided services to approximately 213,000 clients. The centers were staffed by 104 physicians, 33 dentists, 29 mid-level practitioners and 131 nurses. Of these, six physicians and four dentists were National Health Service Corps obligated providers. The Community and Migrant Health Centers are serving medically underserved areas where the only other alternatives for health care is oftentimes a hospital emergency room or no care at all.

Official Relationships with Mexico

The Department of Health and Human Services (HHS) has no bilateral agreements with the Secretariat of Health (SSA) of Mexico regarding the border area. However, HHS, through the Public Health Service (PHS) and SSA have been cooperating informally on border issues, on a regular basis, since 1942. For example, PHS and SSA are currently cooperating in a number of areas to facilitate the surveillance and control of cholera and working in 10 "sister cities" to develop binational health projects in six priority health areas.

Through its Field Office in El Paso, Texas, the Pan American Health Organization (PAHO) has provided a key informal forum for Federal, state and local health officials to both discuss binational health issues and cooperate in intervention activities. Over the years cooperative activities have ranged from rabies control to tuberculosis prevention and control. Both epidemiological

TABLE 11
FACILITIES OBLIGATED UNDER THE HILL-BURTON PROGRAM

Location	Obligated Facility	Type of Facility
California		
San Diego County		
Coronado	Coronado Hospital	Hospital
National City	Paradise Valley Hospital	Hospital
San Diego	Logan Heights Family Health Center	Outpatient
San Ysidro	Centro de Salud Ysidro[1]	Outpatient
Imperial County		
Brawley	Clinic de Salud del Pueblo[1]	Outpatient
El Centro	El Centro Regional Medical Center	Hospital
Arizona		
Yuma County	None	None
Santa Cruz County		
Nogales	Mariposa Community Health Center[1]	Outpatient
Cochise County		
Benson	Benson Hospital	Hospital
Douglas	Southeast Arizona Medical Center	Hospital
Sierra Vista	Sierra Vista Community Hospital	Hospital
Willcox	North Cochise Community Hospital	Hospital
New Mexico		
Dona Ana County		
Sunland Park	La Clinica de Familia[1]	Outpatient

TABLE 11
FACILITIES OBLIGATED UNDER THE HILL BURTON-PROGRAM
(Continued)

Location	Obligated Facility	Type of Facility
Texas		
El Paso County		
El Paso	El Paso City County Public Health Center	Public Health Center
El Paso	El Paso Cancer Treatment Center	Outpatient
El Paso	Neighborhood Health Centers[1]	Public Health Center
El Paso	R. E. Thomason General Hospital[1]	Hospital
El Paso	Carnell House	Nursing Home
Val Verde County		
Del Rio	Val Verde Memorial Hospital[1]	Hospital
Maverick County		
Eagle Pass	Maverick County Hospital District[1]	Hospital
Webb County		
Laredo	Mercy Regional Medical Center	Hospital
Hidalgo County		
Edinburg	Edinburg General Hospital	Hospital
Cameron County		
Brownsville	Brownsville Community Health Center[1]	Outpatient

1. Certified under compliance alternative.

NOTE: These hospitals and clinics received Federal Hill-Burton construction funds, which obligates them to provide health services free and/or at reduced cost to eligible patients for a period of 20 years.

and health statistics data are also provided to the PAHO Field Office by both sides. These data are of particular importance because they serve as an early warning about disease outbreaks, or, in the case of health statistics, provide information about health status and health needs.

The Food and Drug Administration of the PHS has a long history of cooperation with its counterpart regulatory authorities in Mexico. This cooperation has resulted in the establishment of three Memoranda of Understanding: one on general cooperation on scientific and regulatory issues; one on the export of shellfish with Mexico's Secretariat of Health; and one on products in international trade with the Secretariat of Agriculture. This cooperation includes the exchange of information on regulatory requirements, working to solve regulatory problems, and providing training to Mexican staff on inspection and analytical techniques.

FDA has also trained Mexican inspectors on good manufacturing practices for pharmaceuticals and analysis of products for cholera. However, regulatory problems persist with products imported from Mexico, particularly illegal pesticide residues on fresh produce.

PHS and SSA are currently cooperating in a new strategy focussed on the U.S.-Mexico border. Through a series of local meetings, six border-wide priority areas have been agreed upon for binational cooperation. These are: primary care; disease prevention/health promotion; substance abuse; maternal and child health; occupational health and environmental health. Cooperation is being limited to border sister cities, with responsibility for developing cooperative activities in the hands of city/county health officers. This relationship has no specially earmarked funds. Rather the effort is focused on utilizing existing programs and resources in a more coordinated and effective manner. There is emphasis on developing partnerships among governmental, academic and public and private for profit and non-profit institutions.

Additional emphasis will be placed on developing health profiles of border sister cities, to assist both in measuring the efforts of binational cooperation and in identifying emerging areas of need. Developing such profiles will require improved access to and analysis of statistical and epidemiological data from both sides of the border. The PAHO Field Office is participating in this activity, in close cooperation with U.S. and Mexican Federal, state and local governments.

Existing relationships between the EPA and SEDUE and the IBWC improving the border environment are of keen interest to health officials. Improved monitoring and enforcement of regulations regarding water and air pollution, sewage disposal, and hazardous waste management

are key factors in the health of several communities. Ongoing activities which are described in the Border Plan, if put into effect and carried to conclusion, will have a positive impact on health status on both sides of the border.

c. Health Implications of the NAFTA

As noted in Section III, there are some formidable difficulties in forecasting the impact of a yet to defined agreement. The following health implications of the NAFTA will be based on the economic development, population growth, migration, environmental contamination, health status and other indicators previously discussed. One should recognize that these are attempts to predict the health status and/or behavior of large numbers of people migrating to the border or other areas from the interior of Mexico, and speculating on how that might impact on health services.

The health effects of improper disposal of toxic substances is an area of special concern. However, projecting the exact disease patterns in this area is not possible with present data collection systems, since dose related data would be incomplete or almost impossible to reconstruct. In this regard, the Agency for Toxic Substances and Disease Registry (ATSDR) could have a key role to play on the border in developing approaches to provide future risk assessments and disease studies in close collaboration with SSA.

Scenario without NAFTA

From the regulatory perspective of the Food and Drug Administration, the no-NAFTA scenario should have no major effect on current FDA operations to monitor the food imports along the border. Unless there are major reductions in budgetary support for food testing, FDA can meet the anticipated growth in trade with no-NAFTA. Although there are some concerns over the lack of progress to resolve some regulatory problems with Mexican counterpart agencies, current cooperative efforts between FDA and counterpart regulatory authorities could be expected to continue at the same level of effectiveness and intensity.

In estimating the implications for health in border communities if a free trade agreement is not concluded, several predictions can be made. It can be presumed that additional maquiladoras will continue to open up on the Mexican side of the border, with the concomitant increase in migration from the interior of Mexico to the border. Environmental pollution from these maquiladoras will

continue to be concentrated in existing highly populated corridors, unless Mexican regulatory resources can be enhanced. The existing stresses on the infrastructure and services on both sides of the border will continue to outpace public resource capacity from national,state or local resources. The continued high rate of population growth will increase the number of colonias and the crowding in existing housing. Despite the current level of effort by U.S. and Mexican authorities to provide more sanitation, potable water services and basic health care, a larger absolute number of people will remain without adequate services despite increases in the number of people utilizing health services and the number of families/ housing units receiving hookups to appropriately engineered systems.

Without NAFTA or a major change in the price of petroleum, the state of the Mexican economy will probably be marked by a slow recovery which will not permit significant new health or environmental sanitation investments. Such an economy will accelerate migration to the border and beyond from central Mexico.

The Mexican Social Security system (IMSS), is a health care system for the employed. It is supported by higher level wages/contributions from the maquiladoras and should be capable of providing high quality basic health services for employees. However, for lower wage, support and service industry personnel that may be on contract to the maquiladoras, and therefore not paying full IMSS premiums, it is doubtful whether they will be fully insured. We expect that they would join the pools of the marginally insured or uninsured. This group could easily equal those directly insured by the maquiladoras, thus adding to the pool of susceptibles in the expanding colonias.

In summary, under the no-NAFTA, the key infectious diseases continue to be major problems at the same incidence levels, particularly Hepatitis A, tuberculosis and the diarrheal diseases. The level of AIDS continues to increase, primarily through the heterosexual route because of the highly mobile migrant workers without families. Cholera outbreaks increase with frequency but are aggressively controlled by the SSA with PHS cooperation. Measles is the only disease which continues to decrease as the SSA vigorously implements the childhood immunization campaigns throughout Mexico, including the border area. The number of cases of diabetes mellitus, accidents and other chronic diseases will increase slowly with the growth of the population, as government based services will not have sufficient resources to mount effective prevention campaigns. The requirement for maternal and child health services, particularly obstetrical services will continue to increase on both sides of the border, with a disproportionate number seeking deliveries in U.S.

institutions because of the quality of services and the hopes for U.S. citizenship for their children.

If the no NAFTA environmental scenario is played out, ie., no greater emphasis by Mexico on environmental enforcement along the border, the environmental health issues could increase geometrically, particularly for victims of surface water and groundwater pollution. This could result in a dramatic upswing of health problems from bacterial contamination of water supply to toxic effects from hazardous waste. Health and environmental resources are currently inadequate for such scenarios on both sides of the border and can be expected to remain so under a no NAFTA scenario.

Scenario with a NAFTA

Whether considering Scenario One or Scenario Two, imports of FDA-regulated products could be expected to increase, with a commensurate increase in regulatory problems. With the NAFTA scenario, it could be anticipated that FDA would receive increased budgetary support to meet the increased monitoring and laboratory testing required by the greater volume of imported food products. Additionally, the NAFTA should stimulate higher levels of commitment by Mexico to solve regulatory problems than would occur under the no-NAFTA scenario. Moreover, NAFTA should promote systems and criteria similar to those established in the U.S., which will help ensure the safety, quality and effectiveness of FDA-regulated products. It would be extremely important that these cooperative efforts with Mexico lead to enhanced Mexican standards, conformity assessment procedures (e.g. analyzing products for illegal pesticide residues), and enforcement efforts. In the long term, this would benefit U.S. consumers by providing added assurance that products imported from Mexico meet U.S. standards.

In looking at the health implications for border communities, there could be differences in the long term, based on the projections made under the two scenarios.

Under Scenario One, projections are for an expected industrial growth of 6 to 17 percent over the next decade and population growth of 50 to 230 percent in 10 years. Such growth can be expected to further stress infrastructure on both sides of the border. The Mexican IMSS can be expected to be overburdened by a continuing influx of population requiring health services. At least in the near term, the IMSS could not be expected to receive the additional financial and human resources to provide complete services to the burgeoning population.

The key infectious diseases would continue to be major problems in the short term, particularly Hepatitis A, tuberculosis and the diarrheal diseases. Sporadic outbreaks of cholera would continue to occur, particularly from "imported" cases migrating to or passing through the border area. The level of AIDS transmission can be expected to continue.

Should the type of industry that comes to the border change, or become more varied under a NAFTA, it could result in a different demographic pattern for the population employed and the risk in terms of occupational and environmental health effects. Maquiladoras currently attract mainly young women. Such potential changes could have an impact on disease patterns and the type of demand for health services.

If the environmental scenario of increased cooperation in environmental pollution control is carried out, resulting in improved air, water and workplace quality, the resulting effects on health would be positive. Such activity, however, would have to include improvement of the sanitation infrastructure and housing conditions in the communities themselves.

As with the no NAFTA scenario, it would be difficult to predict the health status and the impact on U.S. health services of Mexicans migrating to the border to find employment on the Mexican side. But we can anticipate that as the population continues to increase on the Mexican side, selected health care services on the U.S. side, such as obstetrics, will continue to be used by the Mexican population. It is anticipated that the budgetary capacity of U.S. border communities may continue to be poor and that significant new health resources will not be forthcoming to meet the increasing need.

At least for the near term, the next five years, health resources on either side of the border could not be expected to keep pace with the increased community needs.

Under Scenario Two, projections are for an expected industrial growth of 4 to 13 percent on the border. This lower growth is based on the expectation that more industry will locate in the interior, closer to major urban centers, since they would, under NAFTA, be able to sell their commodities to the domestic Mexican market. In addition, it is suggested that labor there would be more stable. Using this scenario, it is suggested that this will alleviate a considerable amount of the population migration and environmental degradation on the border itself.

However, Scenario Two could have an adverse effect on the ratio of population and employment opportunities on the border. If employment opportunities do not keep up with

the size of the work force, the resultant unemployment on the Mexican side could have implications for migration into U.S. border cities, with concomitant pressures on the health care system.

Generally, however, Scenario Two in the long term could be expected to be a positive influence on the situation on the border. The mix of border and interior industry growth could tend to keep up with the need for new jobs for border populations and keep migration down from the interior, due to employment opportunities closer to other urban centers. This could have the effect of improving the economic situation, without suffering a heavy influx of people on the border who will overload the systems' capacity to absorb them.

If the NAFTA is successful in increasing economic development in Mexico generally, and along the border specifically, increased governmental support to the community and health infrastructure could be expected, accompanied by an improved overall health status.

However, the above mentioned improvements would not occur immediately. As with Scenario One, in the near term disease incidence and the health system's ability to provide services could not be expected to improve dramatically on either side of the border. Unsanitary and crowded living conditions can be expected to continue, with the resultant levels of infectious diseases. In the long term, one could expect the disease incidence and level of environmental pollution to lessen considerably.

Under all of the scenarios, occupational health infrastructure would be inadequate to deal with the growth of industries. Even though some maquiladoras currently have health care personnel on the premises, they are usually not trained in occupational health. The focus thus far has been on participating in the delivery of health care services to workers and their families, providing such services as immunizations, in cooperation with the IMSS.

The potential environmental and occupational health impacts of a NAFTA warrant careful analysis, ongoing monitoring and ameliorative action as necessary.

d. Health Policy and Program Options

The Department of Health and Human Services, Public Health Service, will continue to fund both block grants to states and categorical programs, as well as carry out its food and drug regulatory responsibilities. But more will need to be done. Key to anticipating need is to be better informed of the situation along the border. Attention will have to be focussed on a variety of issues such as:

- Addressing ways to coordinate growth along the border so that rapid industrial development and a related large influx of population would occur in accordance with appropriate infrastructure development, e.g. a binational zoning advisory commission, thereby providing the local infrastructure a better opportunity to support the growth, avoid environmental degradation and prevent deteriorating health conditions.

- Focusing on major border health and environmental issues through a coordinated, binational surveillance, planning and implementation system.

- Initiating a process to unify occupational safety and health regulation and environmental enforcement issues.

- Providing authority for Federal, State and local health and environmental programs to support binational planning, implementation and funding of cross-border disease prevention and control activities.

- Continuation of cooperation with Mexico under existing agreements and other bilateral and multilateral efforts to prevent and resolve regulatory problems and enhance Mexico's infrastructure and technical capabilities.

- Development of a better system to make health and social services data accessible from the many sources now collecting it. Within this context are the problems of dealing with some populations which are too small to derive meaningful statistical rates, and confidentiality issues relating to data collection.

- Development of better systems for sharing border health data from both sides of the border so that better community health profiles can be developed.

- Development and better coordination of epidemiological surveillance for infectious diseases and occupational illnesses and injuries.

- An increased focus and better harmonization of activities by Federal and State health officials on program development and funding for border communities.

- Better integration and harmonization of health programs by federally-funded community based organizations and State and local health programs.

- Increased emphasis on monitoring evolving demographic patterns. Identification of changes needed in the type of health care available if maternal-child health, chronic diseases, and infectious disease patterns change.

- More studies directed toward developing a mechanism obtaining information on the questions and gaps identified in this discussion. The data obtained could be the basis upon which rational planning and decisions can be made about allocation of health resources to border communities.

- Development of mechanisms to foster closer cooperation among health and environment agencies at all levels in the U.S. and Mexico.

- Improvement of public health infrastructure and resources to better deal with current environmental and health service issues and those resulting from future NAFTA activities.

- Acknowledgement of the international nature of border communities and development of appropriate mechanisms by which program funding can support binational, cross border planning and implementation of disease prevention and control activities.

e. Recommendations to NAFTA Negotiators

(1) Maintain the right to monitor products, set standards and regulations, including the right to prohibit market access for products without appropriate national approval.

(2) Facilitate the enhancement of Mexican standards, conformity assessment procedures, and enforcement efforts.

D. INVESTMENT FLOWS

1. Issue

The question of potential environmental impacts associated with increased growth and investment likely to result from a NAFTA has been considered above. This sub-

section reviews a somewhat different question: will differences in environmental regulation and enforcement lead to significant "pollution haven" investment by U.S., Canadian, or foreign firms in Mexico?

2. Background

The question of the effect of differing environmental protection costs on firm relocation and investment decisions did not originate in NAFTA discussions, but has been an issue in the environmental debate since the 1970s. The effect of proposed environmental regulations on industry competitiveness, and the possibility that firms might relocate to avoid high compliance costs has frequently been an argument raised by opponents of new environmental standards, and has helped define the character of environmental legislation.[19]

The plausibility of the argument that differences in environmental enforcement standards would lead to reallocations of investment and shifts in industry has led to a series of studies to examine the extent to which these shifts have taken place.[20] Despite a number of

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[19] For example, competition among localities in the United States for industrial location appears to have motivated Congressional voting on PSD (prevention of significant deterioration) legislation in the late 1970s, since it had the effect of levelling the playing field across regions. (See Peter Pashigan, "Environmental Regulation: Whose Self-Interests are Being Protected?" Economic Inquiry 23 (1985) pp 551-84.)

[20] These studies can be divided into those that examine location decisions in the United States, and those that look at international firm location. For the U.S., see:

Duerksen, Christopher J., Environmental Regulation and Industrial Plant Siting: How to Make it Work Better (Washington; The Conservation Foundation, 1983) (This study also examines international location.)

Bartik, Timothy, "The Effects of Environmental Regulation on Business Location in the United States" Growth and Change 19 (1988) pp 22-44.

McConnell, Virginia and Robert Schwab, "The Impact of Environmental Regulation on Industry Location Decisions: The Motor Vehicle Industry" Land Economics 66 (1990) pp 67-81.

investigations, the conclusions of the studies have been almost uniformly negative: there is little or no aggregate evidence of industrial relocation to take advantage of environmental compliance cost differences. A conclusion typical of these studies is the one reached by the Conservation Foundation:

> The research for the Conservation Foundation's Industrial Siting Project failed to turn up any credible evidence that environmental restrictions have precipitated, or are about to precipitate, a widespread exodus of American industry. In decisions about whether to build abroad or continue operating a facility in the U.S., differentials in environmental-control costs are generally outweighed by production and other capital costs.[21]

There are of course individual instances in which environmental costs have determined location decisions. Pollution costs may be a major locational factor for a few industries, particularly where there are unusually strict standards. For example, new environmental regulations in southern California to improve that region's low air quality are expected to cause some area firms to relocate. In a recent study, the General Accounting Office concluded that various Los Angeles furniture manufacturers had left

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For studies that examine location decisions internationally, see:

Duerksen, Christopher and H. J. Leonard, "Environmental Regulations and the Location of Industries: An International Perspective" Columbia Journal of World Business Summer 1980.

Pearson, Charles, Down to Business: Multinational Corporations, the Environment, and Development (Washington; World Resources Institute, 1985).

Leonard, H. J., Pollution and the Struggle for World Product (New York; Cambridge Univ Press, 1988).

(Footnote 20 continued)

Tobey, James, "The Effects of Domestic Environmental Policies on the Patterns of World Trade: An Empirical Test" Kyklos 43 (1990) pp 191-209.

[21] Duerksen, Christopher, Environmental Regulation of Industrial Plant Siting: How to Make it Work Better (Washington; Conservation Foundation, 1983) p xx.

the area due to stricter environmental standards, with some moving to Mexico and others to locations elsewhere in the United States. However, the ability of differences in environmental compliance costs to lead to a widespread or extensive relocation of industry has not been established.

3. Possible Environmental Effects of the NAFTA

a. Introduction

Not all industries will be affected equally by differences in environmental regulation once a NAFTA is established. In this section we examine the industrial characteristics of industries where investment flows might be based on environmental considerations, as well as identifying industries that might have incentives to redirect investment.

Four industrial characteristics are required for the formation of a NAFTA to have a significant investment effect due to differences in environmental standards. These points are elaborated and applied to U.S. manufacturing industries in the discussion below.

(1) Environmental compliance costs in the industry represent a significant portion of total operating costs.

(2) Existing trade barriers must be significant.

(3) Costs associated with relocating an industry or creating new capacity must not overwhelm the compliance cost gains.

(4) Differences in environmental compliance costs that a firm actually bears must be sufficiently different among the three countries to encourage location based on environmental differences.

b. Importance of Environmental Compliance Costs

The first characteristic, that environmental compliance costs play a significant role in total costs is necessary in order to create sufficient incentives for firms to relocate. One measure of compliance costs is the data collected by the Bureau of the Census on pollution abatement expenditures for manufacturing industries at the four-digit standard industrial classification (SIC) level, encompassing about 445 individual industries. To gauge the importance of compliance costs we compare them to industry value added, the difference between the product price and

the cost of inputs purchased from other industries.[22] Column 3 of the table shows abatement costs as a percentage of value added. The data shown in the table are for all industries (62 out of 445) with abatement costs accounting for two percent or more of value added, and the industries are ranked in descending importance of compliance costs.

Pollution abatement expenditures make up a small share of costs for most industries, averaging only 1.1 percent of value added across all industries (Table 12, row 1). Eighty-six percent of 445 industries have pollution abatement costs less than two percent of value added. A visual description of the characteristics is shown in Figure 4, which is a histogram (frequency diagram) of the pollution abatement cost share, which shows most industries bunched around abatement costs of one percent of value added.

c. Existing Trade Barriers

In assessing the effects of a NAFTA on investment flows it is not enough that an industry have high pollution abatement costs. For the NAFTA to have an effect, the free trade agreement must change the locational opportunities open to firms, making available options that do not already exist. Existing tariff rates are shown in column 4 of Table 12. As is evident from the table, in many of the industries with the highest pollution abatement costs U.S. tariffs are already very low, either for location in Mexico or elsewhere. Of course tariffs are not the only form of trade barrier; the United States also has quantitative restrictions, although on a relatively small number of industries.

Table 13 lists industries from Table 12 that have high pollution abatement costs (3 percent of value added or more) and high U.S. import barriers (tariffs of 2 percent or higher, and/or quantitative restrictions). The 11 industries in Table 13 meet both characteristics, and thus could be considered candidates for investment relocation due to a NAFTA. This is not a statement that these industries will relocate as a result of differing environmental standards, since other characteristics,

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[22] This is a conservative measure of the importance of pollution abatement costs, since a significant share of those costs come from purchased energy and other inputs, and are not included in value-added (in other words, they have already been subtracted from the product price to calculate value-added). Thus the measures in Table 12 overstate the importance of pollution abatement costs in total costs.

Table 12
Industries with Largest Expenditures for Environmental Pollution Abatement
and US Tariff Rates

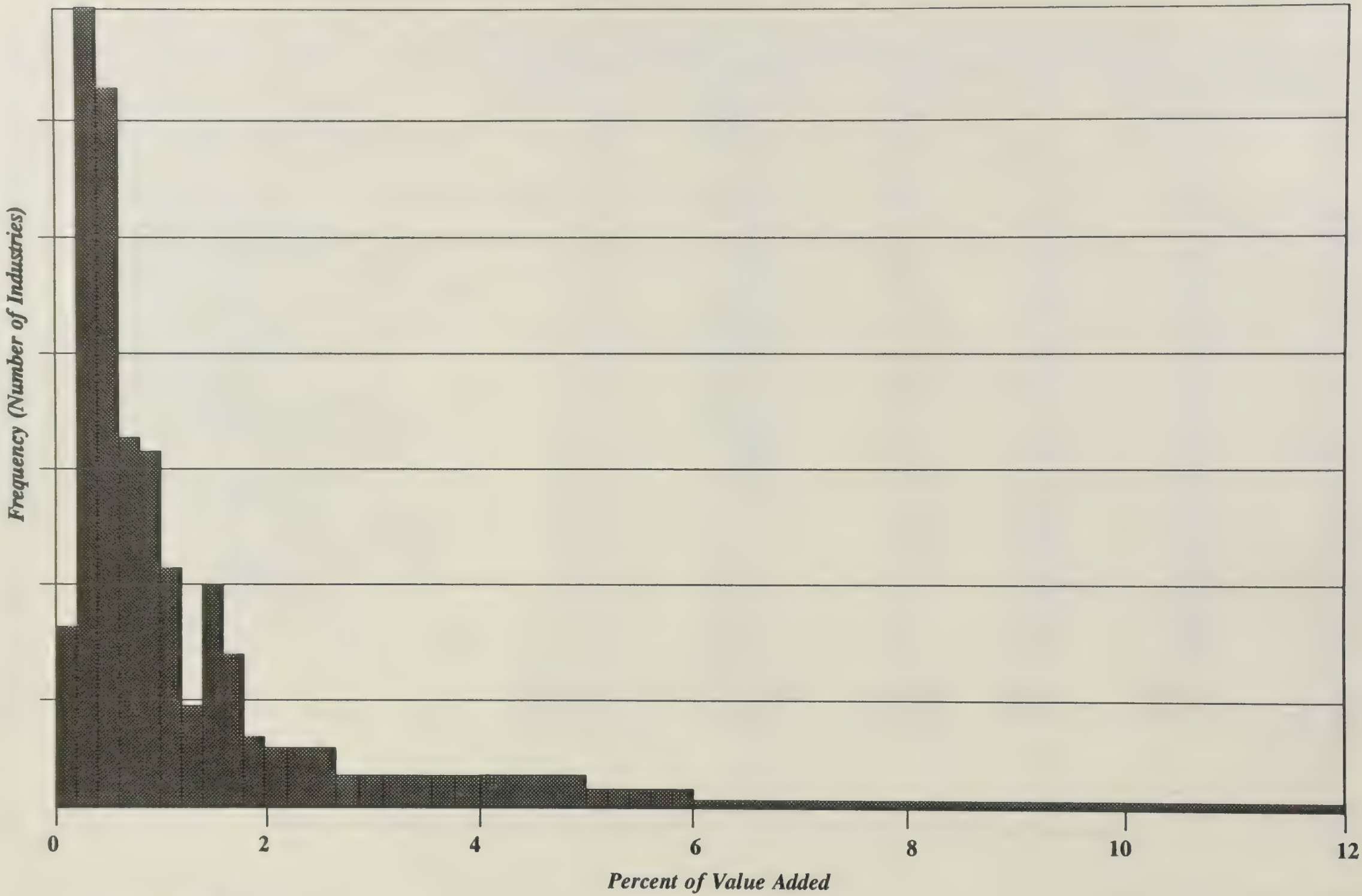
SIC Code	Industry	Total Abatement Cost (million $)	Value Added (million $)	Abate Cost as % of Value A	Tariff Rate	Employees (thous)	Value Added per Employee ($ thous)
	TOTAL ALL INDUSTRIES	14008.6	1262412	1.1%		19148.3	65.9
3331	Primary Copper	159.0	721.6	22.0%	1.0%	3.6	200.4
2911	Petroleum Refining	1919.3	20687.6	9.3%	1.0%	73.2	282.6
3313	Electrometallurgic steel	37.1	508.4	7.3%	2.2%	5.1	99.7
2874	Phosphatic fertilizers	118.1	1619.5	7.3%	0.0%	10.4	155.7
2999	Petroleum and coal nec	16.6	249.0	6.7%	1.0%	1.9	131.1
3241	Hydraulic cement	134.0	2184.7	6.1%	0.0%	18.6	117.5
3341	Secondary nonferrous metals	71.5	1180.3	6.1%	1.5%	13.2	89.4
3449	Misc metal work	77.8	1334.1	5.8%		25.1	53.2
2816	Inorganic pigments	92.9	1642.4	5.7%	5.2%	8.9	184.5
2865	Cyclic crudes & intermediates	214.4	4252.5	5.0%	9.8%	23.9	177.9
2491	Wood preserving	29.6	605.0	4.9%	0.0%	11.7	51.7
2077	Animal & marine fats & oils	34.9	725.5	4.8%	1.2%	10.2	71.1
2869	Industrial organic chemicals nec	1052.9	22448.1	4.7%	8.1%	97.1	231.2
2812	Alkalies and chlorine	60.0	1324.1	4.5%	0.1%	6.5	203.7
3274	Lime	17.5	418.0	4.2%	1.7%	5.7	73.3
2833	Medicinals & botanicals	86.8	2086.2	4.2%	6.0%	11.3	184.6
3369	Nonferrous foundries nec	9.0	217.1	4.1%		4.4	49.3
2822	Synthetic rubber	63.6	1540.6	4.1%	0.6%	11.3	136.3
2611	Pulp mills	127.5	3116.5	4.1%	0.0%	14.4	216.4
3312	Blast furnaces, steel mills	793.2	19555.7	4.1%	4.9%	195.2	100.2
2873	Nitrogenous fertilizers	47.4	1173.2	4.0%	0.0%	7.2	162.9
2819	Industrial organic chemicals nec	329.5	8285.6	4.0%	0.6%	72.2	114.8
2621	Paper mills	661.2	16866.2	3.9%	0.5%	130.4	129.3
3334	Primary aluminum	143.5	3663.6	3.9%	0.0%	18.9	193.8
2631	Paperboard mills	334.6	8778.5	3.8%		53.6	163.8
3321	Gray and ductile iron foundries	167.8	4473.9	3.8%	3.6%	87.3	51.2
2892	Explosives	28.3	764.3	3.7%	4.0%	13.6	56.2
2754	Commercial printing, gravure	54.0	1520.1	3.6%		24.0	63.3
3463	Nonferrous forgings	13.3	404.0	3.3%		7.0	57.7
3296	Mineral wool	67.6	2065.8	3.3%	5.5%	20.8	99.3
2879	Agricultural chemicals nec	138.5	4285.8	3.2%	9.2%	15.9	269.5
3292	Asbestos products	6.7	210.5	3.2%	0.0%	3.4	61.9
2061	Raw cane sugar	15.5	493.6	3.1%		6.2	79.6
2083	Malt	5.5	178.0	3.1%	1.8%	1.4	127.1

Table 12
Industries with Largest Expenditures for Environmental Pollution Abatement
and US Tariff Rates
(Cont'd)

SIC Code	Industry	Total Abatement Cost (million $)	Value Added (million $)	Abate Cost as % of Value A	Tariff Rate	Employees (thous)	Value Add per Employee ($ thous)
3356	Nonferrous rolling and drawing n.e.c.	39.8	1378.3	2.9%	3.3%	18.4	74.9
3339	Primary nonferrous metals, n.e.c.	34.5	1196.9	2.9%	0.4%	10.1	118.5
2499	Wood products, n.e.c.	47.6	1667.3	2.9%	1.3%	54.0	30.9
2861	Gum and wood chemicals	8.1	284.7	2.8%	2.2%	2.7	105.4
2823	Cellulosic manmade fibers	16.9	614.9	2.7%	6.7%	10.2	60.3
2141	Tobacco stemming and redrying	14.1	542.8	2.6%	2.1%	7.0	77.5
3412	Metal barrels, drums, and pails	10.6	408.4	2.6%	0.0%	8.2	49.8
3353	Aluminum sheet, plates, and foil	50.8	1959.7	2.6%	3.1%	26.1	75.1
3365	Aluminum foundries	28.3	1133.2	2.5%	5.3%	26.4	42.9
3325	Steel foundries, n.e.c.	30.7	1229.8	2.5%		24.8	49.6
2076	Vegetable oil mills, n.e.c.	1.6	64.5	2.5%	3.4%	0.7	92.1
3355	Aluminum rolling and drawing, n.e.c.	4.0	162.7	2.5%		0.8	203.4
3471	Plating and polishing	67.3	2810.7	2.4%		76.3	36.8
2262	Finishing plants, manmade	31.2	1305.0	2.4%		26.6	49.1
2046	Wet corn milling	50.5	2120.2	2.4%	4.8%	9.2	230.5
2952	Asphalt felts and coatings	30.5	1287.9	2.4%	5.2%	13.4	96.1
3399	Primary metal products, n.e.c.	19.4	839.5	2.3%	0.9%	14.2	59.1
2899	Chemical preparations, n.e.c.	103.9	4537.9	2.3%	5.8%	37.0	122.6
2821	Plastics materials and synthetics	301.5	13196.7	2.3%	7.8%	58.3	226.4
3295	Mineral, ground or treated	20.0	901.4	2.2%	2.3%	9.4	95.9
3624	Carbon and graphite products	13.7	618.7	2.2%	3.2%	10.3	60.1
2269	Finishing plants, n.e.c.	8.9	408.4	2.2%		11.4	35.8
2074	Cottonseed oil mills	5.7	264.7	2.2%	0.1%	2.9	91.3
3483	Ammunition, except for small arms n.e.c	47.8	2340.4	2.0%		39.9	58.7
2075	Soybean oil mills	28.7	1411.4	2.0%	6.7%	6.7	210.7
3494	Valves and pipe fittings, n.e.c.	30.2	1506.6	2.0%	5.0%	26.9	56.0
3452	Bolts, nuts, rivets, and washers	64.5	3219.2	2.0%	3.6%	54.3	59.3
2541	Wood partitions & fixtures	32.2	1623.8	2.0%		40.3	40.3

Sources: US Dept of Commerce, Bureau of the Census, Manufacturer's Pollution Abatement Capital Expenditures and Operating Costs 1988 (Report MA200(88)-1, Sept.); Bureau of the Census, Annual Survey of Manufactures 1989: Statistics for Industry Groups and Industries (Report M89(AS)-1), and tariff estimates from US Office of the Special Trade Representative.

Figure 4
Pollution Abatement Costs by Industry
Percent of Value Added



Source: See Table 5

Table 13
Industries with High Compliance Costs
and High Existing Trade Barriers

Added SIC Worker Code	Industry	Value per ($ thous)
3313	Electrometallurgical steel (due to steel quotas)	99.7
2911	Petroleum refining (due to possible relaxation of Mexican investment restrictions, and the fact that the nominal tariff rate is a high effective tariff)	282.6
2816	Inorganic pigments	184.5
2865	Cyclic crudes and intermediates	177.9
2869	Industrial organic chemicals nec	231.2
2833	Medicinals and botanical compounds	184.6
3312	Blast furnaces and steel mills	195.2
3321	Gray and ductile iron foundaries	51.2
2892	Explosives	56.2
3296	Mineral wool	99.3
2879	Agricultural chemicals nec	269.5
	Manufacturing total	65.9

Source: Table 12.

examined below, must be met. These are simply industries that satisfy the first two of the four criteria.

d. Other Costs Associated with Investments

The issue here is whether additional costs are incurred when facilities are relocated or when new capacity is added to an industry. For a firm considering shutting an existing facility and building a new one elsewhere, there is the loss of any economic returns associated with the existing plant. The issue is not whether the structure and equipment have been fully depreciated in an accounting sense, but whether, after payment of all material costs and labor costs (and before any interest payments or depreciation charges) the plant makes money. In general, the amount of this surplus will depend on the importance of capital in total costs (ie the capital-intensity of the industry) and the age of the facility.

The capital intensity of an industry can be approximated by the value added per employee in an industry; the higher the value added per employee the greater the capital intensity. The average value added per employee in 1988 from the first row in Table 12 was $65,900. As Table 13 indicates, most of the industries with high pollution abatement costs and significant existing trade barriers are also highly capital intensive industries, with high costs of shutting down existing facilities to reopen in a new location.

Table 12 does not present information on the age of existing facilities, which will vary from firm to firm and from plant to plant. If existing facilities are closed down and relocated due to environmental compliance cost differences, it will be the oldest and least efficient that are shut first. In this case differences in environmental standards may have a competitive effect, but the environmental effect may well be positive. This is because new capital equipment is designed to a much higher environmental standard, and in some cases subject to more stringent regulation than the oldest existing facilities. Thus even if movement takes place to an area with lower environmental standards, the net effect may be a reduction in environmental damage.

While the above argument holds for relocating existing facilities, different considerations apply for completely new investments where no existing facility is being shut down. Here what is important is the ability of the world industry to absorb additions to capacity. Although we have not undertaken a formal study of growth prospects, most of the industries listed in Table 13 are lumpy, in the sense that the economic plant size is large relative to the size of the industry, and they are also industries (e.g. steel,

petroleum refining) where substantial, and even excess world capacity exists. Even with an advantage in environmental compliance costs, it is unlikely that a de novo investment in these industries would be profitable.

e. Differences in Environmental Compliance Costs that the Firm Pays

The last characteristic is that a firm considering an investment actually faces and expects to face significant differences in compliance costs based on location. As other sections of this review have stressed, Mexican environmental standards are comparable to those of the United States and Canada, and in some cases may exceed the standards of those two countries. Although concerns have been raised about the enforcement of environmental standards in Mexico, the country has announced its intention to strengthen environmental enforcement and devote more resources to enforcement activity, and its announced unwillingness to be the home of pollution haven foreign investment. This latter point is important, for it is not past practice that is controlling for an investment decision, but the expected compliance costs over the life of the contemplated investment. Even if Mexican enforcement efforts were to fail to live up to their current announced intention, a firm contemplating an investment must take into account the possibility that Mexican standards and their enforcement will increase in the future.

There is one additional point that should be raised. Because of the historic sensitivity of foreign investment in a developing country such as Mexico, and in the wake of the highly publicized and damaging Bhopal chemical leak, foreign investors may feel themselves bound to a higher standard of safety and environmental emissions control than that which covers domestic firms. This may be true because environmental damage in one facility may adversely affect the operations of the firm in other countries where it has investments. This may explain the public stance of many large American companies, who have said that they follow U.S. pollution control practices and standards in their facilities outside the United States. Typical of these public statements is the one given by Ford Motor Company in a paper on its maquiladora operations:

> Though not required by Mexican law or regulation, Ford's policy is that Ford environmental practices in the U.S. also be applied at our Mexican maquiladora facilities.[23]

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[23] "Environmental Practices, Health and Safety Standards and Employee Welfare at Ford Motor Company's Maquiladora Facilities in Mexico" (Detroit; Ford Motor Company, March 19, 1991) p 4.

This effect may not hold for all investors, particularly in industries with a large number of small firms with minimal capital investments, but it is likely to be true of the large, capital-intensive firms that characterize many of the industries in Tables 12 and 13.

f. Conclusion on Environmental Effects

Although relocation of investment to avoid stricter environmental restrictions may be a plausible outcome of differences in environmental standards and enforcement, and such movement has taken place in some instances, the phenomenon does not appear to widespread, nor is it likely to characterize the formation of a NAFTA. This is because relatively few firms meet all of the conditions required for profitable pollution haven investment -- high environmental compliance costs, a big change in locational incentives as a result of removal of trade barriers, low costs associated with new investment, and actual differences in environmental compliance costs.

E. TRANSPORT ASPECTS

1. Issue

If increased trade follows implementation of a NAFTA, land transportation traffic levels would increase, with potential environmental consequences. The NAFTA Land Transportation Negotiating Group is also discussing liberalization and market access issues related to the provision of transportation services.

2. Background

a. Legislation and Regulations

A number of U.S. environmental laws and regulations affect transportation operations in the United States. These laws regulate emissions of pollutants and noise from vehicles, as well as transportation of hazardous materials and wastes. In addition, if improvement of transportation facilities is funded with federal assistance or requires federal approval, environmental consequences of the action must be considered under the National Environmental Policy Act and other environmental laws such as the Endangered Species Act, the National Historic Preservation Act, and the Fish and Wildlife Conservation Act.

Noise

Transportation noise has been and will continue to be a significant transportation issue. Control of highway noise involves a three-part approach -- highway design, adjoining land use control, and control of noise at its source. Considerable progress has been made in the last two decades in the control of transportation noise at its source as well as reduction of noise impacts to receptors. Under the Noise Control Act of 1982, EPA has the authority to regulate noise emissions from various equipment, including setting operational standards for aircraft and for truck and rail equipment operated by interstate carriers.

EPA has promulgated engine noise regulations for heavy trucks (over 10,000 pounds) involved in interstate commerce. Effective January 1, 1988, newly manufactured trucks must meet an 80 decibel limit (at 50 feet). In-use (pre-1988) trucks over 10,000 pounds in interstate commerce must meet a standard of 83 decibels (dB) at 50 feet for speeds under 35 mph, 87 dB for speeds over 35 mph, and 85 dB while stationary. Enforcement is conducted in connection with state and federal safety inspections.

As with motor carriers, the Noise Control Act directed EPA to establish noise emission regulations for surface carriers engaged in interstate commerce by rail (49 U.S.C. 4916). In 1976, EPA established noise emission limits for stationary and moving locomotives and moving railroad cars (40 CFR Part 201). In 1980, EPA issued standards for noise from retarders, rail car couplings, and locomotive engine tests. The Federal Railroad Administration (FRA) issued regulations for compliance with noise emission regulations (49 CFR Part 210).

Environmental Review of Transportation Projects

Federally funded and approved transportation projects must comply with a number of federal environmental review requirements. The National Environmental Policy Act directs federal agencies to assure that environmental values are considered in making decisions. An environmental impact statement is prepared if significant impacts on the environment are expected. Other federal laws and executive orders protect water quality, wetland areas, parks, historic resources, and wildlife. States also have environmental review and protection requirements that may affect highway or rail improvements.

International bridges require a Presidential permit. Environmental documentation on impacts on the U.S. side of the border is prepared by the State Department based upon information supplied by the bridge sponsor. The U.S. Coast

Guard has permitting authority that primarily addresses navigation concerns.

Transportation of Hazardous Materials and Wastes

Federal regulation of transportation of hazardous materials is aimed at assuring safety of the public through proper containment of hazardous materials during transportation and adequate communication of the nature of the hazard. The Hazardous Materials Transportation Act, as amended, governs transportation of materials that the Secretary of Transportation has found may pose an unreasonable risk to health and safety or to property when transported in commerce. Hazardous materials include explosives, flammables, corrosives, poisons, and other materials that have acute potential for human injury as well as radioactive and disease-causing (etiologic) agents. The Department of Transportation's hazardous materials regulations cover proper packaging, marking, labelling, and classification of hazardous materials and substances. Title 49, Parts 174-177 relate specifically to carriage of hazardous materials by air, rail, water, and highway.

Hazardous substances and wastes are controlled by legislation administered by EPA, but are regulated by DOT as hazardous materials for the purposes of transportation. These environmental statutes include the Comprehensive Environmental Response Compensation and Liability Act, as amended; the Clean Water Act; and the Resource Conservation and Recovery Act (RCRA). The RCRA authorizes EPA to regulate hazardous wastes and develop hazardous waste management practices. Through reporting and manifesting requirements, EPA tracks hazardous wastes, including imports and exports, from "cradle to grave" -- that is, from their place of generation to final disposal. Shipments of hazardous wastes must comply with the regulations applicable to hazardous materials having similar hazardous properties. Shipments of hazardous wastes originating in Mexico are subject to the requirements of the hazardous materials regulations.

Hazardous goods shipped in international commerce must also meet international standards that assure common classification, identification of hazards, and packaging standards. The United Nations Committee of Experts on the Transport of Dangerous Goods has adopted recommendations that are observed in international commerce. DOT recently revised packaging standards to align the U.S. hazardous materials regulations with international standards and replace the earlier specification packaging system with a performance-oriented packaging system.

b. Current Transborder Transportation Patterns and Problems

Trucking

Current Mexican law prohibits foreign-owned or -operated motor carriers from doing business in Mexico. Retaliatory U.S. legislation, enacted in 1982, imposed a moratorium on new Interstate Commerce Commission (ICC) grants of operating authority to Mexican motor carriers wishing to operate in the United States. The legislation also limited Mexican motor carrier operations to ICC-defined commercial zones along the U.S.-Mexican border. Thus, U.S. truckers transporting goods bound for Mexico must stop at the border and transfer cargo to Mexican carriers for the remainder of the trip. Similarly, Mexican carriers with cargo destined for points beyond the U.S. commercial zone must arrange for its transfer to U.S. carriers. These restrictions on the transportation industry pose a serious safety risk due to the extra handling requirements of hazardous materials.

In spite of these restrictions, current transborder truck traffic is significant. Between 1987 and 1990, truck traffic from Mexico into the United States increased 42 percent. In fiscal year 1990, according to the U.S. Customs Service, almost 1.7 million trucks crossed through the seven largest ports of entry from Mexico to the United States. In all, about 1.8 million commercial vehicles crossed the U.S.-Mexico border in 1990. Somewhere between 70 and 80 percent of all exports to and imports from Mexico (by value, varying by season) travel by truck. Laredo, El Paso, San Diego, and Nogales account for most of the traffic.

Rail

As trade between the United States and Mexico has increased, so has rail traffic between the two countries. According to U.S. Customs Districts data, the number of northbound railcars processed in the four Customs Districts increased from approximately 71,000 in 1986 to 116,000 in 1990.

The Laredo district, which includes most of southern Texas along the Rio Grande valley, accounts for more than one-half of U.S.-Mexico trade. This district has experienced the largest overall traffic increase in a wide variety of commodities. Northbound railcars have increased by 94 percent over the period. In the El Paso district, where 85 percent of the traffic is related to the maquiladora industry and over 90 percent of the traffic is routed through the city of El Paso, northbound railcars increased by 34 percent. Rail traffic doubled at border

crossings in the Nogales district, primarily due to the opening of the Ford Motor Company assembly plant at Hermosillo. At San Diego, where rail traffic crosses the border through San Ysidro and Calexico ports, and traffic is principally short-haul and related to the maquiladora industry, northbound rail traffic increased by about 18 percent over the period.

The Mexican railroad, the Ferrocarriles Nacionales de Mexico (FNM), is fully government-owned, and the Mexican constitution requires that railroads operating in Mexico will be government-controlled. In practice, however, U.S. railroads are now frequently permitted to carry cargo directly to Mexican destinations using their own equipment. As in the United States, use of tracks is arranged through commercial negotiations between railroads -- in this case, between a given U.S. railroad and the FNM. The FNM has announced a modernization program that, among other things, will include authority for private unit trains (single commodity trains to one destination) to run on FNM tracks and for private ownership of a wide range of terminal facilities.

Recently introduced double-stack container service, whereby containers are stacked two-high in a depressed railcar well, has resulted in greater rail efficiency and diversion of truck traffic, according to railroad estimates. Plans are underway to expand this service.

Maritime

The dollar value of total U.S. waterborne trade with Mexico in 1990 was $6.4 billion or 11 percent of total U.S-Mexico trade. Imports account for 77 percent of the trade and include steel, coffee, fertilizer, and petroleum products. Exports account for 23 percent of the trade and include agricultural products and equipment and auto parts.

The last 20 years have seen a substantial port development and expansion program in Mexico. The total number of ports increased from 40 in 1970 to 84 in 1987, and major industrial port facilities were developed during the 1980s at Lazaro Cardenas on the Pacific and Altamira on the Gulf of Mexico.

Until recently, the government owned and operated all ports and port facilities in Mexico. Mexico has taken steps to privatize its national port system and make it more attractive to foreign shipping companies. Privatization is expected to proceed slowly, however, and will consist of granting concessions to allow private companies to own and operate warehouses and docks, and long-term leasing of terminals and other facilities.

Foreign investment in ports will be allowed, but the projects must be incorporated under Mexican law.

Landside aspects of port activities are included in the NAFTA negotiations on Land Transportation. No other topics will be addressed.

Hazardous Materials/Hazardous Wastes

Mexico is our third largest trading partner in chemicals, after Japan and Canada. In 1989, 6 percent of the U.S. chemical export trade, amounting to $2.2 billion, and almost 3 percent of the U.S. chemical import trade, amounting to $582 million, was with Mexico. The vast majority of hazardous materials are shipped by truck. These include many of the materials handled by the maquiladora plants along the border, such as solvents, acids, resins, paints, plastics, heavy metals, oils, and varnishes. For the railroads, hazardous materials represent between 4 and 5 percent of traffic moving between the United States and Mexico, including some asbestos, petrochemicals, vinyl chloride, hydrogen peroxide, caustic soda, and some other chemicals. All shipments of hazardous materials originating in Mexico and entering the United States must be in full compliance with the U.S. hazardous materials regulations.

A major problem for the movement of hazardous materials between the United States and Mexico is the set of restrictions on truck operations and access. Hazardous materials shipments must be transferred to another vehicle at the border to comply with U.S. and Mexican restrictions on access by one another's vehicles -- a potentially dangerous practice that presents an unnecessary environmental risk.

Transboundary movement of hazardous waste between Mexico and the United States poses unique challenges. A primary concern is the difficulty in tracking shipments. Neither the United States nor Mexico has information on the number of authorized hazardous waste transporters or the amounts and types of hazardous wastes transported. The problem is exacerbated by the complexities of crossborder truck transportation and the difficulties involved in coordinating the activities of the numerous U.S. and Mexican agencies responsible for hazardous waste regulation.

Current waste tracking in Mexico relies on the Guia Ecologica (Ecological Guides), which include a manifest and transport and acceptance of hazardous residues forms. These must be forwarded to the General Department of Prevention and Control of Environmental Pollution within SEDUE. Since this reporting mechanism is new, the amount

of waste produced, stored, or shipped off-site in Mexico is not known.

Hazardous waste legally exported to Mexico is monitored by EPA. U.S. waste exporters are required to file an annual notice of the projected amount of waste that they will ship. EPA uses this information to request consent from SEDUE for the shipment to take place. The frequency of illegal waste exports to Mexico is not known, nor is the ultimate fate of such illegal shipments. SEDUE and EPA are in the process of developing a mechanism for assuring the return of illegally exported wastes to the country of origin.

Waste is tracked in the United States through state manifest and reporting systems. Current U.S. tracking of waste received from a foreign source consists of manifests and data from other reports. However, this information is often incomplete. In addition, U.S. treatment, storage, and disposal facilities must notify EPA of their first receipt of a shipment of each waste stream from a foreign source. This gives EPA and U.S. Customs advance notice of the Mexican facility shipping the waste and the U.S. parties involved.

3. Possible Environmental Effects of the NAFTA

a. Trucking

Transborder commercial traffic has doubled in the last five years. Some experts familiar with trade patterns between the United States and Mexico predict that commercial traffic will double and then double again by the year 2000, even in the event that a free trade agreement is not successfully negotiated. This could mean that we could see as many as 8 million commercial vehicles arriving in the United States from Mexico each year by the turn of the century.

One of the United States' goals in the NAFTA process is the elimination of mutually restrictive barriers that impede the efficiency of transborder transportation and have adverse environmental consequences. For example, should the NAFTA result in changes to the current system that requires cargo moving from the United States to Mexico by truck to be transferred to a Mexican vehicle for the trip from the border into Mexico, the necessity for Mexican trucks to cross the border empty for the purpose of picking up cargo bound for Mexico would be eliminated, and many trucks from both countries with through cargoes could avoid border transfers. Elimination of these cross-border trips by empty trucks, as well as use of transfer distribution yards in the commercial zone, would mean that the expected increase in commercial traffic by the year 2000 would not

be as large as some have predicted, and hazardous materials transfers could be avoided, with consequent environmental benefits.

It is quite possible, however, that the difference in traffic resulting from more efficient carriage, would be more than made up for by an overall increase in crossborder traffic resulting from NAFTA-generated increases in U.S.-Mexico trade. In any event, a significant increase in transborder commercial traffic is inevitable. It is not inconceivable that by 2000, upwards of 12 million trucks will cross the U.S.-Mexico border in both directions each year.

If the NAFTA results in significant increases in truck traffic, then we can expect corresponding increases in environmental problems stemming from emissions, congestion, and noise.

Noise. As with emission controls, Mexican trucks do not now have to meet engine manufacturing standards such as those in effect in the United States to reduce engine noise. Thus, if, as expected, the NAFTA results in increased numbers of Mexican trucks traveling in the United States, the noise problems associated with commercial vehicles will increase.

b. Rail

According to the rail industry, a NAFTA will likely result in increased rail movements of grain, steel, manufactured items, consumer products, and some soda ash to Mexico. Auto parts transportation may also increase, although this is dependent upon the U.S. market for North American-made vehicles. Increased exports from Mexico may include foodstuffs, beer, appliances, auto parts, glassware, and perhaps steel. Transport of hazardous commodities is not expected to materially increase.

Currently, the majority of intermodal traffic moves by rail to the Mexican border and by truck within Mexico. As shipments increase, existing Mexican roads and highways, as well as border communities, may not be able to bear the environmental and congestion burdens of added truck traffic. However, if the NAFTA contains provisions that encourage continued FNM improvements to intermodal handling and terminals in Mexico, more business will be routed over the FNM, thereby avoiding congested roads, city streets, and highway bridges and minimizing adverse environmental effects. U.S. railroads and other private parties can, under current Mexican regulations, participate in building intermodal facilities in Mexico, as long as the facilities are not on railroad property. Such investment, as well as joint U.S. railroad-FNM marketing efforts already underway,

should increase double-stack and other intermodal traffic, attracting some traffic away from motor carriers. Double-stack service has already diverted some traffic away from long-haul motor carriers.

Environmental impacts as a result of increased rail traffic will be related to any facilities constructed to increase system capacity and some increased noise at a few sites experiencing added rail traffic nearby. On the other hand, if new rail services, such as increased use of double-stack trains, are able to shift a substantial amount of the projected increased traffic from truck to rail, there would be some environmental benefits. These issues are discussed in further detail below.

Capacity Improvements. A new international railroad bridge is planned for construction between El Paso and Juarez. As noted above, proposed new international bridges will receive substantial environmental review through the environmental impact process. In this case, particular emphasis will be given to hydrology and water quality impacts. A planned new switching yard to be located on the outskirts of Juarez in an industrial zone will relieve environmental impacts associated with current yards in the center of El Paso and Juarez. U.S. railroads do not anticipate other facility constraints or capacity improvements needed in their systems as a result of increased rail activity stimulated by the NAFTA.

Noise. Railroad noise can be an annoyance for those who live near a busy railyard or rail line. The Noise Control Act of 1972 addressed railroad generated noise in Section 17 of the Act. As required by the Act, EPA established noise emission standards for rail cars, locomotives, car coupling operations, and some other types of equipment used by rail carriers in interstate commerce. The Federal Railroad Administration monitors compliance with the standards. As the number of locomotives in service has been reduced and operations consolidated, along with technological developments that have made trains quieter, the number of people exposed to railroad noise has decreased somewhat. Moreover, potential exposure is relatively small, as most residential communities and business sections in the U.S. are not located close to major rail lines or railroad facilities. Where noise from rail operations has been a problem, railroad companies often work with local governments to address the problem. In the absence of applicable federal regulations, state and local governments have the authority to prescribe railroad operation noise controls.

Environmental Benefits. Modal shifts from truck to rail offer the possibility of improving environmental quality, safety, and energy consumption. Shipping by rail produces far less air pollution and is safer per ton-mile

of freight carried. A recent Federal Railroad Administration report on "Rail vs. Truck Fuel Efficiency" compared truck-competitive rail moves and truck moves between the same origins and destinations, based on actual rail and truck operations. Although the scenarios in the study represent examples of a range of types of comparable freight and cannot be averaged, the study found that all rail equipment achieved higher ton-miles per gallon than truck equipment used to carry the same commodities.

c. Maritime

It is not expected that successful negotiation of a NAFTA will result in significant increases in maritime transportation between the United States and Mexico. The vast majority of cargo transported between the two countries moves by truck or rail, and this should continue to be the case after the NAFTA is signed, particularly if the NAFTA results in an easing of the motor carrier access restrictions on both sides of the border. However, port improvements in Mexico may result in increasingly effective cargo handling.

Mexico's recent port development and privatization programs are designed to position its ports to carry Mexican imports and exports bound for the Far East, South America, Europe and Africa, rather than to prepare for increased bilateral trade with the United States. This orientation program will continue whether or not a NAFTA is successfully negotiated. Nonetheless, carriage between the two countries may grow between selected ports.

For example, the port of Brownsville, Texas, is planning a major expansion of its maritime and intermodal cargo capabilities in anticipation of increased maritime trade with Mexico. Port officials are working with the U.S. Army Corps of Engineers on a plan for a $37 million dredging project that will deepen and widen the Brownsville channel for improved access by larger vessels. Plans are also underway for infrastructure improvements, including a dedicated cargo bridge to Matamoros, Mexico, that could make Brownsville an internodal distribution hub. The port expansion will comply with all applicable environmental regulations.

d. Hazardous Materials/Wastes

As with trade in other types of commodities, it is expected that the NAFTA will result in a significant increase in the flow of hazardous materials between the United States and Mexico, most of which will be transported by truck.

The effect of the NAFTA on transborder movement of hazardous wastes is not as clear. Currently, waste generated by the U.S.-owned maquiladora plants must be sent back to the United States for disposal. If the NAFTA results in modification or elimination of the tariff structure that gave birth to the maquila system, then it would be expected that new and existing foreign investments would not be structured in the same way as the maquiladoras and would not be required to return waste generated to the United States. In that event, Mexico would be responsible for disposing of its own hazardous wastes and, as a result, fewer shipments of hazardous waste would cross the border. (As noted in Sections I and III above, the United States is actively assisting Mexico in improving its hazardous waste treatment capability so that Mexico will be ready to treat and dispose of a steadily greater proportion of work in an environmentally sound manner.)

An increase in the amount of hazardous materials transported between the United States and Mexico means that there could be an increased theoretical risk of hazardous materials incidents and accidents and, it follows, increased opportunities for catastrophic events that could include serious environmental impacts. Hazardous materials truck shipments waiting to clear Customs at ports of entry could expose large population centers to increased hazardous materials risk. For example, El Paso's primary transportation routes at present are an interstate highway and two rail lines that run through the center of the city. Moreover, because of the close proximity of El Paso and Juarez, Mexico, a serious incident in either city could have major implications for the other.

It is difficult to quantify the extent to which increased numbers of hazardous materials shipments result in increased safety and environmental risks. Certainly, the current safety record for hazardous materials transportation along the border is quite good. So long as shipments comply with the U.S. hazardous materials transportation regulations, significant increases in accidents involving hazardous materials transportation are not expected.

The amount of hazardous materials shipped by rail across the border is small and not likely to grow substantially. Most of these shipments are placarded, identifying the shipments as hazardous materials, and are carried in double-hulled cars. EPA and DOT are reviewing DOT regulations to determine whether additional materials, such as pesticides, should be listed as hazardous shipments. Tank car design and operating practices are also under review. Although a few serious rail accidents have been well-publicized, rail is generally considered safer than trucks for carrying hazardous materials, as

trucks move through heavily populated communities in mixed traffic.

4. Environmental Policy and Program Options

There are a number of bilateral programs currently underway that should work to mitigate some of the anticipated adverse environmental effects of the NAFTA discussed above.

Standards Harmonization

The U.S.-Mexico Transportation Working Group (TWG) is one of ten sectoral working groups formed under the 1987 bilateral "Framework of Principles and Procedures for Consultation Regarding Trade and Investment Relations" (The Trade Framework Agreement). The TWG was formally constituted in March 1989 and meets twice a year. Following the July 1990 meeting, both sides agreed that the discussion of several issues had reached a level of technical sophistication that required the formation of subgroups in which experts from both countries could deal directly with one another on a regular basis. Included among the six subgroups are ones that deal with motor vehicle standards and specifications; motor vehicle emissions and size, weight, and dimensions; and technical standards and safety in railroads. The subgroups have begun to examine issues related to standards harmonization for motor vehicles, hazardous materials transportation, and railroads. Although U.S. regulations are enforced for all carriers operating in this country, harmonization is useful for improving transportation efficiency.

Recently, under the auspices of the NAFTA Land Transportation Negotiating Group, a technical trilateral subgroup of experts from Canada, Mexico, and the United States was formed to develop a timetable for harmonization. Most of the participants are already active in bilateral harmonization efforts between the United States and Mexico and the United States and Canada.

Hazardous Materials. Compliance with rigorous safety and environmental protection standards is the key to reducing the risks associated with hazardous materials transportation, and U.S. regulations are enforced for all carriers operating in this country. Current Mexican regulations are not as stringent as those in effect in the United States. Through the TWG, the United States and Mexico have begun working toward harmonized hazardous materials safety regulations. This effort has been complicated by the United States' move toward adoption of the UN international standards for hazardous materials transportation. Mexico is planning to adopt hazardous

materials regulations compatible with, and equivalent to, those in effect in the United States and is on a common timetable for adopting and implementing the international standards. The higher volume of trade in hazardous materials expected as a result of the NAFTA is likely to create an even greater incentive for moving this process forward quickly.

Hazardous Waste

The management of hazardous waste in both Mexico and the United States is of concern to both countries because of the potential for transboundary contamination and potential public health and environmental impacts. As noted above (Section III.C.), EPA and SEDUE are developing a broad-based implementation plan for monitoring the transboundary movement of hazardous wastes. Overall, the implementation plan is based on a shared data base, improved training, regular border checks, a continuous presence at the border, routine/regular personnel exchanges, and coordination with all involved government entities in Mexico and the United States. With specific reference to transportation issues, EPA and SEDUE plan to conduct an environmental evaluation of increased hazardous waste traffic in the border area with recommendations for reducing risks by 1993. In addition, EPA and SEDUE plan to increase training of their personnel in the requirements of the hazardous waste transportation regulations.

5. Recommendations for NAFTA Negotiators

To assure that the potential environmental effects of increased cross-border transportation resulting from the NAFTA are properly addressed in Mexico and the United States, the NAFTA negotiators should work to resolve existing access problems for motor carriers and railroads on both sides of the border.

F. BORDER CONGESTION

1. Issue

Greater cooperation under the NAFTA to facilitate and speed the flow of commerce at the U.S.-Mexico border could improve the air quality in towns where border crossings are located even as the total number of crossings increases.

2. Background

There are over 30 U.S. ports of entry on the southwest U.S.-Mexico border, ranging from the hand-pulled ferry at Los Ebanos, Texas, to the largest and busiest international

border crossing in the world at San Ysidro, California. Some of these border ports are overtaxed; this results in some delays for vehicles crossing the border. Of the seven major cargo processing locations, Otay Mesa, Calexico, Nogales, El Paso, and Laredo have or are undergoing major facilities improvements and renovations, while Brownsville is scheduled for upgrading in 1992. Hidalgo is the only major port not scheduled for major cargo processing improvements in the immediate future.

In addition, the Mexican practice of staging trucks and sending large numbers of trucks across the border at one time adds to delays. Customs is in the process of increasing its workforce on the southwest border; the increase dedicated to cargo processing should be adequate to handle the expected volumes of traffic. Customs is also taking steps to shorten the time between the occurrence of a vacancy and when it is filled.

Facilities. During the past three or four years, there has been an enormous increase in the number of trucks entering the United States from Mexico. Existing facilities, including customs inspection stations, access roads, bridges, and related infrastructure, have undergone or have been scheduled for expansion or improvement to keep pace with this growth.

The number of trucks attempting to cross during peak hours at the busiest ports of entry is multiplied due to Mexico's statutory prohibition against foreign trucks and drivers entering Mexico. Virtually all cargo entering Mexico must be transferred to a Mexican truck, usually on the U.S. side of the border. This can involve the complete unloading and reloading of cargo destined for Mexico or transfers of trailers from U.S. to Mexican tractors. This provides a built-in delay and requires at least a doubling of trucks crossing and re-crossing the border per shipment.

At some ports, local arrangements permit mutual access at great cost to productivity. In Laredo/Nuevo Laredo, for example, trucks from each country may carry cargo across the border provided they return empty. This is highly inefficient and increases the number of trucks crossing the border. U.S. Customs estimates that 20 percent of trucks entering the United States from Mexico are empty. Although these trucks are not subject to complete cargo clearance, they are checked, thus contributing to the backup and waiting time.

Staffing. The problems related to truck access restrictions are complicated by inspection agency staff limitations and inadequate coordination between U.S. and Mexican Customs at some ports. Currently, U.S. Customs is increasing manpower resources at the Mexican border. However, INS received no new positions for the southwest

border for FY 1991. Customs was authorized 370 additional positions for the southwest border; thus far, 316 inspectors are on board. Most ports have added cargo hours of service and changed hours of service to handle peak seasons. However, the Mexicans still release trucks carrying exports to the United States in large groups.

Other factors. There are built-in delays that result from procedures that are required for trucks to be cleared for entry into the United States.

As with any country, trucks arriving in the United States must be properly documented. Customs inspectors assure that vehicles are properly insured and that merchandise is legally released. Customs must therefore assure that what the importer claims is on the truck is actually on the truck and that there are no restrictions on its entry into the United States. Inspectors must also assure that there is no contraband. The port at Otay Mesa clears the highest percentage of cargo -- 8 percent -- of any land border port of entry and also clears the highest percentage -- 45 percent -- through the line release system. Line release uses bar code technology to quickly identify shipper, consignee, broker, and commodity on certain pre-approved shipments. As increasing numbers of facilities are completed and more importers elect to use line release, long lines of trucks should become a rarity.

All persons entering the United States, including foreign nationals, must clear INS. Mexican drivers who wish to travel more than 25 miles into the United States at crossing points where the ICC commercial zone permits such distance, or who plan to spend more than 72 hours in the United States, must receive a special permit from the INS. All agricultural shipments must be inspected by the U.S. Department of Agriculture. In addition, at a few ports, notably Nogales, Arizona, state officials conduct required random safety inspections of Mexican vehicles at the port of entry instead of further inland. While this is a useful "one-stop" process, each entrance procedure that a truck must clear adds to the total time that it takes to cross the border.

U.S. Customs has instituted several innovations designed to speed border clearance. The Maquiladora sealed container program allows low risk cargoes to clear Customs quickly. Line release permits pre-clearance of cargoes for some carriers using computer and bar code technology.

3. Possible Environmental Effects of the NAFTA

Absent improvements in traffic flow, increased commercial traffic resulting from the NAFTA would contribute to existing congestion problems along the

U.S.-Mexico border. Long lines of trucks waiting with engines idling to clear Customs on both sides of the border would add to the air pollution problems in ports of entry. El Paso is a designated nonattainment area for ozone (serious) and carbon monoxide (moderate); San Diego is a nonattainment area because of a severe ozone problem. Further, the El Paso and San Diego (San Ysidro/Otay Mesa) crossings are the two leading ports of entry for commercial traffic from Mexico. Both of these areas are being expanded or renovated, and El Paso has a new facility at nearby Ysletta. Until the expansion is completed, however, it is expected that the increased traffic and increasing border delays will exacerbate the already significant air quality problems in these two cities unless low-tech traffic facilitation improvements -- such as incentives to use off-peak hours -- are made. This factor would need to be considered by local governments in developing revised air quality state implementation plans. Other ports of entry could experience similar, though not as extreme, short-term degradation of air quality until facility expansions to accommodate increased traffic are completed.

To keep pace with traffic increases resulting from increased trade with Mexico, the General Services Administration (GSA) is working with the federal inspection agencies to complete a $360 million project for improvement and construction of facilities on the border, some associated with new bridges. Of this amount, almost $237 million will be spent at five ports that are expected to be most seriously affected by the NAFTA. The project will provide for new Customs import inspection lots and expanded primary inspection lanes at Brownsville, El Paso, Otay Mesa, Nogales, and Calexico. Completely new border stations are planned near Brownsville (pending diplomatic agreement) and Laredo (temporary facilities to be completed by the summer of 1991; permanent facilities by April 1993), as well as at Calexico (March-1994), Andrade, California, Tecate, California, and Naco, Arizona.

Completion of the construction plan should, with the notable exception of San Ysidro, result in inspection facilities that are adequate to handle the greater volume of traffic expected from a NAFTA. Expansion of San Ysidro, already by far the largest crossing on the border, is not feasible, and there are no plans for new crossings in the area. Commercial traffic has been diverted from San Ysidro to nearby Otay Mesa, which is undergoing a substantial expansion expected to be completed early in 1993.

The FNM and the Southern Pacific are planning a new international railroad bridge crossing between El Paso and Juarez and a new integrated, multi-purpose, multi-user switching yard, 12 miles southeast of Juarez in an industrial zone, to connect with the new bridge. In

addition to improved rail service and more efficient customs processing, the relocated combined facility should improve the environment in the centers of El Paso and Juarez. The new bridge will require a U.S. Presidential permit, as well as a bridge permit and an Environmental Impact Statement, with approval from the Coast Guard, the Immigration and Naturalization Service and the Customs Service. Although these facilities are being bilaterally negotiated to provide a more efficient interchange regardless of the NAFTA, the pending agreement is an added impetus to their development.

Utilization of expanded border facilities may be restricted by several other factors, for which there are currently no remedial plans. For example, at several highway crossings, including Nogales, Brownsville, Hidalgo, and Laredo, approaches to the border on the Mexican side are inadequate and cannot be much improved because they pass through congested urban areas, unless bypass roads are constructed. At the Mariposa crossing in Nogales, a two-lane highway on the Mexican side passes between steep cliffs, making widening of the highway difficult. Traffic diversion (as was intended, for example, from downtown Laredo to the new Colombia Bridge) is a possible solution.

In addition to urban congestion around the ports, some new border crossings, such as the one at Colombia, Mexico, in Nuevo Leon, are approached on the U.S. side by narrow roads that are entirely inadequate for heavy volumes of large truck traffic. There are currently no plans for improving these roads, although on the Mexican side, new roads to provide improved access to the bridge are planned or under construction.

In addition, there are certain factors that operate to thwart the benefits of facility improvement. For example, the new Zaragosa Bridge near El Paso has modern, spacious new facilities designed to ensure rapid processing of entering traffic; however, the bridge charges a toll for use, including a $15.00 toll for use by commercial trucks going from Mexico into the United States. This ensures that most cars and many trucks will continue to use the old Bridge of the Americas that feeds directly into downtown El Paso until it is closed for renovation.

Improvements in highway and entry port infrastructure are imperative to handle the traffic increases anticipated as a result of the NAFTA. A number of projects are planned for the border area already. Where such projects are federally funded, such as Customs facility improvements or expanded highway access, or are the product of international negotiations, such as international bridges or new ports of entry, then the requirements associated with the federal environmental procedures would apply. States also have environmental impact requirements for highway and rail

projects. Overall, however, significant adverse environmental impacts are not likely, and there may be some important environmental benefits resulting from construction of new or improved infrastructure projects.

4. Environmental Policy and Program Options

There are a number of programs currently underway that should work to mitigate some of the congestion problems discussed above.

a. Increased U.S.-Mexico Customs Cooperation

Some Customs ideas under discussion include:

(1) Harmonizing documentation requirements so that shippers can present one set of documents that meet all three governments' requirements, minimizing the probability that a shipper will be turned back, and

(2) Coordinating opening times for border posts so that staff time is used to best advantage.

b. Interagency Working Groups

Through the TWG, the Department of Transportation, and U.S. Customs, working with other agencies, have instituted a special effort to evaluate the extent of the congestion problem along the U.S.-Mexico border, identify the causes of the congestion, and recommend solutions. In particular, the group will look at low-cost, non-technical remedies to congestion problems. Among the possible solutions that will be considered are: (1) ways to redistribute the traffic load beyond peak periods, such as off-peak pricing; (2) expanded operating hours for Customs/Immigration facilities; (3) separation of automobile traffic from commercial traffic at ports of entry; (4) increased use in both Mexico and the United States of automated border clearance and pre-clearance procedures; (5) dissemination of information on congestion at particular ports of entry (like weather reports) so that travelers can plan to avoid the congestion where possible; and (6) increased resources, including staff.

This ongoing effort will be coordinated with the NAFTA Rules of Origin and Customs Facilitation Group to ensure that needed changes are implemented for both sides with firm commitments. The group will review information provided by other government agencies and concerned industries, such as shippers, carriers, and customs brokers. The group will of course include participants

from Mexico, so that bilateral solutions to the problem of congestion at border crossing can be explored.

In addition, the Department of State heads an interagency bilateral coordination group that deals with international border crossings and bridges. This group meets quarterly and includes representation from all of the U.S. and Mexican agencies that have an interest in or are involved with border crossing issues.

5. Recommendations for NAFTA Negotiators

To assure that the potential environmental effects of increased cross-border transportation and resulting congestion at border crossing points are diminished to the extent possible, the NAFTA negotiators should work toward harmonization of differing or inconsistent Customs procedures in the United States and Mexico that serve to exacerbate border crossing delays.

G. PRODUCT STANDARDS[24]

1. Issue

Whether successful challenges to stringent U.S. health, consumer protection, or environmental standards could result from provisions of a NAFTA that set disciplines on the use of product standards, technical regulations, and conformity assessment procedures as arbitrary or unjustified trade barriers, or NAFTA provisions that provide for the enhancement of product standards.

2. Background

As described in Part II above, it has been agreed by the U.S., Mexico and Canada that a NAFTA will include provisions setting disciplines on the use of standards, technical regulations and conformity assessment procedures.

Such disciplines are needed to deal with the possibility that, with the reduction in tariffs and other trade barriers provided for in other parts of the NAFTA, standards or technical regulations might be used in NAFTA countries to give affected industries and agricultural producers protection from external competition and thus frustrate the goals of the agreement. In addition, these

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[24] Also, see discussion in Section III.J.1, Control of Pesticides and Pesticide Residues on Food.

disciplines help to ensure protection of the integrity of U.S. regulations and standards.

Product standards and technical regulations that would potentially be covered by such provisions frequently are imposed by the U.S. and other countries to restrict trade in order to protect human, animal and plant health and the environment. Such standards often have the effect of prohibiting the import of products not in compliance. For example, the U.S. Environmental Protection Agency establishes maximum pesticide residue limits on food products available for sale in the U.S. The U.S. Food and Drug Administration (FDA) enforces such pesticide residue limits on food products, including border inspection of fresh and processed food items. Products containing residues which exceed EPA limits or residues for which EPA has not established tolerances (or otherwise not conforming to safety standards as established by the FDA) are denied entry to the U.S.

Similarly, EPA and the Department of Transportation regulate the trade in, and transport of, hazardous materials and waste. Such products can be extremely dangerous to the environment and the U.S. prohibits or tightly regulates the importation (and exportation) of a number of hazardous materials.

There are a variety of other mandatory product standards, technical regulations and conformity assessment procedures applied in the U.S. to protect the health and safety of U.S. citizens or the environment that can affect trade flows. These include: restrictions on products containing food additives not approved by the FDA; prohibitions on the entry of pharmaceutical products prior to the completion of regulatory approvals; restraints on the importation of meat and meat products that do not meet USDA standards of hygiene and safety.

In many of the specific cases cited above, standards, technical regulations and conformity assessment procedures applied by the U.S. (and the prohibitions on the entry of products not meeting these standards) are stricter than those established by such international standards bodies as the Codex Alimentarius, the International Standards Organization or similar international organizations and associations, although the contrary is also true in a large number of cases.

These differences arise in some cases because U.S. regulatory agencies act more quickly in light of new scientific evidence or have a higher standard of safety which new products must meet to be marketed in the U.S. In other cases there may be not much disagreement on the scientific evidence concerning the toxicity or other safety or environmental risks of a product, but U.S. standards may

differ because U.S. law provides a greater degree of protection than would the international organization. Factors specific to the U.S., such as consumption patterns, or agricultural practices in the case of pesticide residue limits, also may lead to different standards.

An environmental concern related to the negotiation of a NAFTA is that Mexico might utilize NAFTA provisions on product standards to challenge such regulations as non-tariff trade barriers, and that dispute settlement panel rulings in such cases could result in findings adverse to the U.S., requiring the Administration to ask Congress for changes in the level of protection afforded by such standards to bring the provisions into compliance with a dispute settlement outcome.

It is recognized, however, that standards and technical regulations can be used in such a way as to create unjustified trade barriers. For example, in its 1986 agreement of accession to the GATT, Mexico committed to remove certain import licensing requirements that provided substantial protection to its producers of temperate climate fruits such as apples, peaches, pears, etc. This commitment was not fulfilled until this year. Within days of lifting these licenses, however, Mexico imposed restrictive phytosanitary requirements that impaired U.S. export interests.

The U.S. has protested certain aspects of these phytosanitary restrictions, as being of questionable scientific value and also the manner in which they were implemented.

NAFTA provisions disciplining the use of such measures would provide an improved framework to challenge unjustified trade barriers on the basis of scientific considerations and in accordance with determinations relating to acceptable levels of risk.

3. Possible Environmental Effects of a NAFTA

As noted in Part II, on May 1 the Administration made a commitment to Congress that in a NAFTA:

- The U.S. will not agree to weaken U.S. environmental and health laws or regulations as part of the FTA, and will maintain enforcement of them;

- The U.S. will not agree to weaken existing U.S. pesticide, energy conservation, toxic waste or health and safety standards in the FTA and will maintain enforcement of them;

- The U.S. will maintain the right of each party to undertake any verifying measures within its own territory that are necessary for the enforcement of technical regulations and standards to protect human health and the environment, consistent with principles of non-discrimination; and

- The U.S. will maintain the integrity of the U.S. regulatory process, which is based on available scientific evidence, provides for public participation, and is consistent with the principle of non-discrimination.

In the negotiations, the U.S. has been clear that acceptable standards provisions in a NAFTA must be compatible with these principles. Mexico and Canada have not contested this premise.

In any case, there is agreement that the standards provisions of the NAFTA will set disciplines on the standards setting processes in each country, but not actually set standards for products in trade among NAFTA countries.

U.S. government health and environmental regulatory agencies are playing prominent roles in the NAFTA standards negotiations and will be carefully scrutinizing proposed NAFTA disciplines to analyze how they might affect any existing or proposed U.S. health, safety, food, pesticide, drug, environmental or other regulations and standards, and to ensure such disciplines are consistent with the principles cited above. The U.S. will only agree to disciplines if it is confident that all current U.S. standards, technical regulations and conformity assessment procedures are consistent with them.

4. Environmental Policy and Program Options

Over the longer term, trade barriers can be lowered, trade disputes minimized and the protection of the health, safety and the environment of North America maximized, if standards, technical regulations and conformity assessment procedures in the three countries are enhanced and made compatible.

In an annex to Chapter 7 of the U.S.-Canada Free Trade Agreement, the U.S. and Canada provided for the establishment of nine technical working groups in the field of agriculture to work toward the harmonization or equivalence of standards and technical regulations in the following areas:

- animal health;

- o plant health, seeds and fertilizer;
- o meat and poultry inspection;
- o fruit, vegetable, dairy and egg inspection;
- o veterinary drugs and feeds;
- o food, beverage, and color additives and unavoidable contaminants;
- o pesticides and fertilizers;
- o packaging and labelling of agricultural, food, beverage, and certain related goods for human consumption; and
- o fish and fish products.

In the two-plus years since entry into force of the U.S.-Canadian FTA there has been good progress in these technical working groups. Each party has a much better understanding of the other's systems for the development of standards. Nevertheless, the U.S. and Canada understand that the goal of harmonization equivalence is a long term one, given their regulatory responsibilities and authorities.

Given the differing starting points of U.S., Mexican and Canadian systems for developing product standards, it may well take longer to reach compatibility in standards, technical regulations and related enforcement in a North American context. In this context, the May 1 commitment of the Administration is to:

- o Work together to enhance environmental, health and safety regulatory standards regarding products based on sound scientific evidence through such means as:
  - -- Sharing scientific and technical information to develop an improved common basis for health, safety and environmental standards; and,
  - -- Assuring public participation in the standards setting process.
- o Work together to promote improved enforcement of standards by:
  - -- Holding joint meetings to discuss enhancement of enforcement capability, quality assurance programs, inspection training and monitoring and verification;

-- Exchanging information in areas including analytical methodologies and the interpretation of laboratory results; and,

-- Assisting in training programs to instill Good Laboratory Practices, Good Manufacturing Practices, and to help implement other aspects of sound inspection and compliance programs.

The U.S. Government is working to assist Mexico in these areas and is open to the establishment of a follow-up mechanism to facilitate technical agency participation in the standards enhancement process.

Another important aspect to standards enhancement is the involvement of the private sector. Many of the product standards other than health and environmental standards in the U.S. actually are developed and implemented on a voluntary basis by private standards-setting bodies. Greater cooperation between such standards setting bodies, together with the current trend towards privatization of Mexican standards, can help achieve enhancement and greater compatibility of standards in the North American market. A group of U.S. standards organizations has begun the process of cooperation with its Mexican and Canadian counterparts. A highly successful trilateral meeting was held for this purpose in August 1991.

5. Recommendations for NAFTA Negotiations

Full implementation of the Administration's commitments listed above concerning the ability to maintain, enforce, and verify product standards more stringent than international standards will be essential to ensuring that the NAFTA has no adverse effect on present or future U.S. health and safety, conservation, environmental or other standards affecting products in trade.

Special attention should be paid during the negotiation of disciplines to allow for restrictive measures to be taken pursuant to domestic statutes and administrative procedures when there is scientific evidence indicating a possible risk to human health, plant or animal health, or risk to the environment. Each country's right to make its own risk management decisions in light of societal judgements should be explicitly reserved, provided these decisions are not taken arbitrarily as a means to protect competitive products.

In addition, the NAFTA should explicitly reserve the rights of signatory countries to maintain existing and future rights, consistent with other international obligations, to limit trade in items or products controlled

by international treaties to which they are or may become party, including:

- Trade in an endangered species pursuant to the Convention on International Trade in Endangered Species (CITES).

- Trade in whale products pursuant to the International Whaling Convention.

- Trade in chlorofluorocarbons and other ozone depleting substances pursuant to the Montreal Protocol to the Vienna Convention for the Protection of the Ozone Layer.

- Trade or shipments of hazardous waste pursuant to the Basel Convention.

Dispute settlement provisions relating to the standards disciplines are also very important. For example, in the event a dispute arises as to whether a standard, technical regulation, or conformity assessment procedure that is more stringent than international standards constitutes an arbitrary or unjustified trade barrier under the NAFTA, a party challenging the consistency of such measures with the terms of the NAFTA agreement should have the burden of establishing such inconsistency.

Resource costs incurred by environmental agencies in defending U.S. standards from challenge are highest if the NAFTA allows for challenges to be brought by non-governmental organizations and exporters. Therefore, the right to make challenges of this nature should be limited to the governments that are party to the NAFTA. Such a limitation on standing should serve to minimize the resource burden of such cases on regulatory agencies.

Whenever a dispute resolution panel constituted under the NAFTA is called upon to decide factual issues concerning environmental or scientific matters, the panel should have the ability to refer such questions to a board of highly qualified experts in the disciplines involved.

The agreement also should allow each party to five public notice of the commencement of a panel proceeding under the dispute procedures of the agreement addressing scientific or environmental issues, the parties involved, and the nature of the dispute. Each country should be able to solicit public input on such issues, consistent with domestic law and administrative procedures. Whenever the parties agree that a panel report provide a basis for settlement of the dispute, the report of the panel should be promptly filed in a place readily accessible to the public.

H. ENERGY TRADE

1. Issue

Concern for a more efficient, less vulnerable and environmentally sustainable energy future is the foundation of our negotiations with Mexico and reflects the basis of the National Energy Strategy (NES). Our NAFTA negotiations are an example of our international, commercial, regulatory and technology policies which substantially add to the diversity of U.S. sources of energy supplies and offer more flexibility and efficiency in the way energy is transformed and used not only in the United States but also Mexico.

2. Background

The United States and Mexico are major producers and consumers of energy. Trade in energy products is already a significant part of the economic relationship between the two countries. Fuels alone represent 19% of U.S. imports from Mexico. Nearly half of the crude oil stored in the U.S. Strategic Petroleum Reserve was supplied by Mexico. The U.S. is a major supplier of petroleum product imports to Mexico, providing over 75% of its imports.

a. Mexico

Mexico's energy resources are impressive. The Mexican government estimates it has proven reserves of 52 billion barrels of oil and 73 trillion cubic feet of natural gas. Mexico's crude oil reserves alone are twice those of the United States, and represent nearly half of the non-OPEC free world reserves.

The U.S. Geological Survey has estimated that oil remaining to be discovered in Mexico alone could account for about sixteen percent of the oil yet to be discovered in all of the non-OPEC free world countries. Much of these reserves lie in offshore areas along the coast of Mexico. U.S. firms have been at the frontier of a number of new exploration and production technologies, such as horizontal drilling, new seismic techniques and a number of enhanced recovery technologies. Much of the experience with these new technologies reside exclusively with U.S. firms.

The national oil company, Petroleos Mexicanos (PEMEX) exclusively carries out oil and gas exploration, primary refining and basic petrochemical production. The government's financial crisis in the 1980's forced PEMEX to reduce investments in critical areas such as exploration and development, oil field maintenance, and facility construction and improvement. As a result, Mexican crude production peaked in 1982, and has remained stagnant until

very recently. In 1990, production increased about 1% in response to demand and higher prices resulting from the Persian Gulf crisis. PEMEX has set a goal of increasing future production at a rate of 5% annually, but it is questionable if Mexico can mobilize the large amount of capital needed to sustain such higher rates of production.

b. United States

The current NES policy projection of a continuing falloff in U.S. oil output is rooted in recent history. Proved reserves of U.S. crude oil peaked in 1970 at 39 billion barrels; domestic oil production (including natural gas liquids) peaked the same year at 9.5 million barrels per day. Both reserves and production have been declining since then, despite sharply higher oil prices and up to 2 million barrels per day of additional production from Alaska's North Slope.

Coal is this country's most abundant fossil fuel. Over the past decade, its contribution to the Nation's energy supply has increased significantly, so that 23% of the total U.S. requirements for primary energy is 198 were met by coal, very largely through its use as a fuel to generate electricity. U.S. coal is also a valuable export commodity, helping to supply energy in South America. The international dimension of coal use and coal technology is also important. In 1990, more than a billion tons of coal were mined in the U.S. and more than 100 million tons were exported. The U.S. is a leader in developing and demonstrating technologies that use coal in more economical and environmentally acceptable ways.

Public comment received during development of the NES and in response to the draft Environmental Review revealed widespread support for the development and use of renewable energy resources because of their environmental and energy security advantages. Renewables can play a larger role in meeting our energy needs. The fraction of U.S. energy supplied by renewables has been increasing. It is possible to accelerate the growth in renewable supplies over the next 40 years without resorting to permanent subsidies or mandates, since several renewable technologies are on the verge of successful commercialization into the mainstream energy marketplace. Renewables may be particularly attractive and reach economic viability earlier in areas that do not have a large sunk investment in centralized power distribution and generation infrastructure. Some areas of Mexico may be particularly attractive sites for renewable energy.

3. Possible Environmental Effects of the NAFTA (Sectoral Analysis)

Energy policies that do not protect the environment and public health will not be supported. Environmentally sensitive energy policies can substantially reduce the impacts on air, land, and water quality that come from energy extraction, production and use. The keys are advanced technology; improved energy production, distribution, and use practices; and use of market mechanisms that can assist in maintaining adequate supplies of affordable energy while enhancing environmental quality.

a. Natural Gas

Natural gas represents a significant opportunity to supply Mexico's increasing demand for fuel, particularly in the border areas, while reducing emissions of harmful pollutants. Natural gas is the cleanest burning fossil fuel. It can contribute to reducing harmful emissions of SO_2 and NO_x from both industrial and electric utility boilers fired with fossil fuels. Natural gas combustion results in virtually no atmospheric emissions of sulfur oxides (SO_x) or reactive hydrocarbons, and in lower emissions of small particles, carbon monoxide (CO), carbon dioxide (CO_2) and nitrogen oxides (NO_x) than combustion of other fossil fuels.

Mexico's shift over the last decade from being a net exporter of gas to the U.S. to that of a net importer is likely to continue, providing growing opportunities for the U.S. gas industry. In 1990, Mexico imported 42.9 million cubic feet per day of natural gas from the United States. The value of this natural gas for the year was $29.5 million. This was a slight decline from 1989, when Mexican natural gas imports were 46.6 million cubic feet per day and the value of the year's natural gas imports was $36.5 million.

To PEMEX, the highest priority for natural gas is use in the petrochemical industry although all electrical generating facilities in Mexico City are gas-fired. In fact, natural gas production and distribution operations are the responsibility of PEMEX's petrochemical division. The second priority is to allocate gas to those industries that use natural gas as a component of the industrial process, for instance, the glass manufacturing industry. To retain adequate supplies for its petrochemical operations, PEMEX discourages the use of natural gas as a boiler fuel by industry, with the exception of priority industries in areas with environmental problems, such as Mexico City. A NAFTA that achieved the removal of trade barriers to natural gas imports would enable PEMEX to enjoy sufficient supplies for its petrochemical industry and/or

use as a clean boiler fuel. The result would be a positive effect on the environment in Mexico and the border areas of the U.S.

Natural gas may be utilized in two ways to reduce emissions from electric generation plants: (1) as a primary fuel to displace a portion of coal or residual fuel oil, by firing a dual-fuel boiler intermittently with gas or (2) by operation of a parallel gas-fired boiler. In this scheme, total emissions decrease in proportion to the amount of coal or residual fuel oil displaced. Gas in small quantities (10-15%) can also be used as a supplementary fuel to reduce air pollutants created in the primary combustion zone of a coal- or oil-fired boiler.

Lead and sulphur dioxide produced by factories burning heavy fuel oil have created major environmental problems for Mexico. It has been estimated that five million tons of pollutants are emitted into and around Mexico City every year. Present technologies for reducing these emissions from both boilers fired with coal and oil are capital-intensive and have high operation and maintenance costs if you burn high-sulfur fuels. Greater use of natural gas can therefore significantly reduce air pollution loadings.

US/Mexico cooperation on clean coal technologies and pollutant specific reduction technologies developed in the U.S. represent growing opportunities in Mexico. New clean coal technologies developed in the U.S. can substantially improve efficiency and reduce emissions from power plants. Until they are proven at commercial scale, however, their use entails more risk for utilities than conventional technologies. This additional risk could make it difficult for these new technologies to enter the marketplace quickly. The Clean Coal Technology Program, the single largest technology development program in the Department of Energy, is designed to help overcome this risk by offering the Federal Government as a financial partner in demonstrating worthy projects.

b. Refining

Mexican refineries are confronting many of the same environmental problems U.S. refiners faced and solved over the past two decades. This is particularly the case with the upgrading of capacity and the development of new technologies and product specifications to meet increasingly stringent environmental standards. In Mexico these modernization problems have been compounded by severe capital constraints on PEMEX as a result of Mexico's financial crisis.

Mexico currently has eight refineries in operation, with the closing of a major refinery in Mexico City in March 1991 as a result of environmental concerns. That antiquated refinery, built in 1933, caused about 3% of the air pollution in Mexico City. It is doubtful if any of the remaining refineries would meet U.S. environmental standards. These refineries are operating at or beyond ideal capacity levels. For example, in 1990, Mexican refineries were working at over 90% design capacity, and in the first quarter of 1991 are estimated to have operated at 97%, nearly 5% above rates considered optimal.

Domestic product demand is rising rapidly, particularly for gasoline and diesel fuel. Growing demand for product and improved environmental quality are driving the need for major new capacity additions and upgrading of existing capacity. Unleaded gasoline now accounts for 8% of domestic sales, but is expected to increase to more than 40% in four years.

Refining capacity has not kept pace with growing domestic demand. As a result, Mexico has moved from being a net exporter of over 85,000 barrels per day in 1985 to a net importer. Imports are expected to exceed exports by about 15,000 barrels per day in 1991.

c. Petrochemicals

Petrochemicals are a rapidly expanding sector of Mexico's economy. Output has expanded at about 9% annually since 1985. By 1990, Mexico produced 17.5 million tons of petrochemicals, accounting for 12.5% of all PEMEX revenue. Like the refining industry, existing petrochemical plants are being stretched to their limits. Operating rates grew from 67% in 1985 to over 90% in 1990, with some plants operating at over 100% of rated capacity.

Environmental issues relating to petrochemicals include the disposal of waste generated by the production processes and the controlled use of certain petrochemical products which by their very nature are pollutants.

One of the major products key to the improvement of Mexican air quality is methyl tertiary butyl ether (MTBE) which is used as a gasoline additive to replace lead. In 1990, Mexico imported 227,000 tons of MTBE, and currently is planning 7 new MTBE plants which are closely tied to plans to reduce Mexican reliance on leaded gasoline. Realizing the critical value of MTBE and its shortage of investment capital, the Mexican government recently removed MTBE from its list of basic petrochemicals that are reserved for production exclusively by PEMEX.

d. Coal

The Mexican coal industry is dramatically smaller than that of the U.S., both in terms of aggregate production and as a contributor to Mexico's energy mix. In 1987, Mexican production was 6.2 million metric tons (mmt), compared to 833.3 mmt for the U.S. Over time, Mexico is expected to become a major coal importer because it lacks sizeable reserves. Mexico, however, does export some coal to the U.S.

Minera Carbonifera Rio Escondio (MICARE) is the country's largest coal producer. It was established as the exclusive supplier to the government electricity monopoly, the Federal Commission of Electricity (CFE). MICARE, which produces nearly 40% of Mexican national output at its mining complex in Coahuila, is owned principally by the Mexican government.

Mexico would like to expand its coal production to reduce domestic oil consumption and maintain oil exports in the face of declining oil production. Domestic production supplies about 4mmt to CFE; about 3mmt of metallurgical grade coal to Sidermax, the state owned steel company; and about 4mmt to industrial plants.

The Rio Escondio mine complex supplies the country's only coal-fired power generating facility. This facility was constructed in 1987 and is about 20 miles from the Texas border. The 1200 megawatt plant annually burns a low quality steam coal, containing 38 percent ash. In 1989, the Mexican government invested $18.5 million to install washers in the plant to reduce the amount of ash. Another coal-fired plant is planned for location several miles north of the city of Tampico on the Gulf of Mexico. This plant will probably be fueled by Colombian coal, which has a higher sulfur content than U.S. western coal.

U.S industry is at the forefront in developing new uses for coal ash, in such areas as construction and road building, and the extraction of trace elements from coal ash. To combat pollution generated by coal-fired plants, the U.S. electricity industry is pursuing clean coal technologies in the areas of coal cleaning, retrofit emissions controls, new generating options, and the integration of various advanced processes into the coal refinery of the future. Thus far, Mexico has made only limited use of new "clean coal" technology developed in the U.S., primarily as a result of financial constraints.

e. Electricity

While the 1980's brought wide variations in trade between the U.S. and Canada, US-Mexico trade remained small

and basically unchanged. Limited transmission capability exists between the U.S. and Mexico; some ties exist in Texas, California and Arizona, and a small area of Baja California Norte, Mexico, has synchronous ties with the U.S. system. Most other electricity trade between the U.S. and Mexico occurs over low voltage lines not usually in operation for large volume international use. Only small amounts of trade occur on these lines, and the interconnections are used mainly for emergency assistance, short-term capacity, and economy energy agreements.

The prospect of enhanced electricity interchanges between the United States and Mexico potentially raises environmental issues related to (1) the increased utilization of existing U.S. sources; (2) siting issues related to new capacity in the United States; (3) siting issues related to new transmission facilities; and (4) transboundary air pollution emanating from either country.

Demand for electricity is projected to grow in the United States and Mexico. U.S. electricity sales growth is projected to be 1.9% per year through 1995, and 2.1% per year thereafter to 2000. The Mexican forecasts see a near-term high of 7.2 percent annually to the year 1995 for peak load growth and thereafter dropping slightly to a 6.7 annual percentage to 2000 for their most likely base case. The electrical sector in Mexico has faced the continuous requirement to provide more electrical energy to support domestic economic development.

The United States and Mexico began electricity exchanges in 1905. These early exchanges were few and not very significant, used to serve sparsely populated border towns. Demographic and economic conditions spurred a significant increase in electricity transactions between Mexico and the United States during the middle of this century. However, between 1977 and 1984, Mexican-U.S. electricity exchanges decreased as a result of major CFE transmission reinforcements, including the installation of a new 230-volt supply by CFE to Ciudad Juarez. These changes reduced the need for electricity imports by Mexico.

Limited trade has occurred between the utilities in the Southwest and Mexico in recent years. In the region, the El Paso Electric Company is the largest trader, exporting 55 million kilowatt-hours (kWh) in 1990 compared with 28 million kWh in 1987. Gross electricity imports from Mexico to the U.S. remained steady from 1987 to 1990. In 1990, San Diego Gas & Electric (SDG&E) imported more than 1 billion kWh and Southern California Edison (SCE) imported 0.6 billion kWh. Together, these utilities accounted for almost all of the U.S. imports from Mexico. Also during 1990, SDG&E exported over 400 million kWh and SCE exported more than 100 million kWh, together accounting for almost 90% of U.S. exports into all Mexico.

Mexico has been described by U.S. industry as "ideal" for cogeneration to meet its increased demand for electricity. Cogeneration is a highly efficient process that produces two useful forms of energy from a single fuel source, usually natural gas. It typically produces power at a lower cost than from oil-fired and coal-fired electrical generating plants. Additionally, cogeneration facilities cost far less to build than conventional utility plants. Cogeneration is emerging as one of the most reliable, cost-effective and environmentally sound methods of power production available. In the U.S., cogeneration is successfully reducing air emissions in the Los Angeles basin and San Joaquin Valley.

4. Environmental Policy and Program Options

While internal policy is a matter for each government, several of the underlying foundations of the NES are of particular relevance to ensuring that shared actions would advance energy and environmental objectives to protect our mutual air shed and border lands and waters. Among those that would be most pertinent:

(1) Increase Energy Efficiency. Increase efficiency in every phase of energy production, transformation, and use.

(2) Increase the Use of Natural Gas. Increase the availability and use of natural gas.

(3) Develop Cost-Competitive Renewable Energy Supplies. Increase research and development cooperation and investment incentives for renewable energy technologies.

(4) Develop and Use Clean Coal Technologies. Develop and facilitate the use of clean coal technologies.

(5) Improve Energy Impact Assessments. Improve analyses of the effects of environmental and other regulation on energy supply and demand.

(6) Improve Siting Processes. Drawing upon U.S. model programs, improve the processes used to site energy facilities, including refineries.

(7) Minimize Wastes. Develop cost-effective, environmentally sensitive techniques to reduce energy-related and other industrial wastes and improve environmental restoration.

(8) Promote Technology Cooperation and Technology Transfer Process. Improve coordination of bilateral governmental programs and cooperative government/industry interactions in the commercialization of energy technologies while ensuring for the adequate protection of intellectual property rights.

5. Recommendations for NAFTA Negotiators

A key NAFTA goal is to establish an open market for energy and petrochemicals in the U.S., Canada and Mexico, a policy consistent with the National Energy Strategy (NES). Stronger and more competitive energy and petrochemical industries in the U.S. and Mexico, as well as Canada, will have a positive and lasting impact on environmental quality in North America. Our objective is to allow markets to determine prices, quantities, and technology choices involving energy production and use.

The U.S. has made a commitment to respect Mexico's constitutional restrictions on energy sectors reserved to state control. Nevertheless, a NAFTA can reduce barriers to trade and investment in the energy sector, supporting environmental goals. To this end, NAFTA negotiators should seek an agreement that will:

(1) Stimulate the use of cleaner fuels and technologies to achieve mutual environmental goals;

(2) Remove bariers to greater use of natural gas, in part to replace some of Mexico's high-sulfur oil in its fuel mix;

(3) Take advantage of natural conditions and prevailing infrastructure to promote rapid introduction of renewable energy in areas where they are most economically attractive;

(4) Promote the use of advanced U.S. clean coal technologies and U.S. low-sulfur coals;

(5) Reduce barriers to private investment in energy industries consistent with Mexico's constitution;

(6) Facilitate trade in goods and services needed to expand Mexico's refinery capacity in keeping with mutual environmental goals;

(7) Remove barriers to increased cross-border electricity trade.

I. DEMOGRAPHIC PATTERNS

Mexico's demographic experience is typical of many developing countries worldwide. Following World War II, Mexico achieved dramatic reductions in mortality, particularly among infants and young children. In the absence of offsetting declines in fertility, the rate of population growth soared. Mexico's population more than tripled between 1940 and 1980, from 20 million to 67 million. An additional 15 million people were added during the last decade, bringing the total to approximately 82 million in 1990.

The country's population growth rate has declined recently -- from 3.42 percent during the period 1940-1980, to 2.3 percent for the period 1989-1990, to an estimated 2 percent in 1991. Historically high rates of natural increase have nonetheless built considerable momentum into Mexico's future population growth -- the population is expected to reach 100 million by the turn of the century -- and are evident today in the still-rapid annual increase in the country's labor force. Approximately one million persons enter Mexico's labor force each year, compared with two million new job-seekers in the United States, which has a population almost three times greater and an economy almost 25 times larger.

1. Illegal Immigration into the U.S.

By 1988, the Mexican-origin population of the United States had passed 12 million, largely as a result of relatively recent increases in immigration. The vast majority of this immigration flow (temporary and permanent) has been comprised of legal entrants to the U.S. This legal immigration has been accompanied, however, by continuous flows of undocumented Mexican immigrants -- the aspect of Mexican immigration which has historically dominated the debate on immigration issues.

The U.S. Government's response to the influx of undocumented Mexicans has varied over the years, reflecting changing U.S. perceptions of the impact of Mexican immigration on domestic U.S. interests. A steady stream of Mexican immigrants entered the U.S. in the early part of this century, even while aggregate immigration from other countries was declining. By the 1920's, Mexican immigration represented 11 percent of total immigration. Mexican immigration slowed during the Depression of the 1930's, and increased as the U.S. economy recovered in the 1940's. A U.S.-Mexico treaty in 1942 provided for the entry of an unlimited number of temporary workers (braceros) in response to war-induced labor shortages in the agricultural sector. By the bracero program's end in 1964, more than 4.5 million Mexicans had come to work

temporarily in the U.S. This program left a lasting impression, on both sides of the border, that Mexican immigrants are temporary; that they go back and forth; and that they eventually return to permanent residence in Mexico.

With the lapse of the bracero program and passage of the Immigration Reform Act of 1965 (amended in 1976), the U.S. checked further increases in legal Mexican immigration -- currently stabilized at a yearly average of about 66,000.

The U.S. government began to focus increasing attention on undocumented immigration after World War II, when illegal immigration picked up sharply, prompting strengthened enforcement efforts by the U.S. Immigration and Naturalization Service. In 1954, for example, the INS deported more than one million undocumented immigrants. U.S concern over the issue waned for twenty years, but was again heightened in the early 1980's, by which time net undocumented immigrants into the U.S. had increased from an estimated 23,000 annually in 1970 to 112,000 annually by 1980. By the early 1980's, an estimated 55 percent of all undocumented immigrants came from Mexico. This more recent concern over illegal immigration led to the Immigration Reform and Control Act of 1986 (IRCA), with its combination of employer sanctions, increased border-patrol enforcement, amnesty,and a program for migrant agricultural workers.

The current wave of Mexican immigration has been the object of a great deal of study, especially with regard to undocumented workers. The available knowledge suggests that: (1) this flow is the result of a U.S. demand for - and a Mexican supply of - labor; (2) it is still largely temporary (6 months on average) -- though there is an increasing trend toward permanent residence; (3) it is not necessarily caused by unemployment, as 80 percent of the migrants have work in Mexico at the time they migrate to the U.S.; (4) migrants come neither from the most depressed regions nor the poorest sectors of Mexican society; (5) single males between the ages of 15 and 19 with more schooling than Mexico's least educated groups predominate; (6) it is geographically concentrated in the U.S. southwest; and (7) it is becoming increasingly facilitated by the development of social and family networks between the U.S. and Mexico which substantially improve the migrants' ability to successfully enter and find work in the U.S., avoid apprehension by immigration authorities, and help finance migration costs.

What then, are the implications of these observations for U.S and Mexican policy makers, and for cooperative efforts to reduce the flow of undocumented immigrants? The U.S. Commission for the Study of International Migration and Cooperative Economic Development focused on

the principal reason people emigrate -- lack of economic opportunity -- and concluded that "expanded trade between the sending countries and the Untied States is the single most important long-term remedy to the problem."

Other observers have focused on the social dimension of the issue. They suggest that past immigration has created entrenched, self-sustaining social networks - able to override barriers to non-legal entry - which are already capable of perpetuating migration regardless of economic forces.

Both perspectives indicate that any serious cooperative efforts to reduce illegal migration will be long-term endeavors. Regardless of the success which the U.S and Mexico hope to achieve in stimulating commerce and economic growth, the U.S. will continue to be a magnet so long as U.S. wages are many times more attractive than Mexico's, and so long as familial and community networks perceive sustained immigration to be in their self--interest. Moreover, a major paradox of the Migration Commissions's study was the conclusion that economic development in the short term stimulates migration by raising expectations and enhancing people's ability to migrate. The main lesson drawn by the Commission over three years of study was that the cooperative efforts of sending and receiving countries, in this case Mexico and the U.S., must stay the course in the face of short-term contradictory results, and that the duration of such efforts will in all likelihood be measured in decades or even generations.

2. Border Population Concentration

According to preliminary results of Mexico's 1990 census, over 13 million persons live in Mexican states which are on the U.S. border. It is a rapidly growing area, having increased in population size by over 23 percent since 1980 - vs. Mexico's overall population growth of 17.6 percent during the same period. Population growth has been even higher in the cities which hug the U.S.-Mexico border - up some 32 percent in population since 1980. The populations of some of these border communities, such as Tijuana, Nogales, and Ciudad Juarez, have more than doubled since the last census.

Many of the new residents were drawn to the region from other parts of Mexico by the relative abundance of job (as of 1989) opportunities in the maquiladora industry. As of 1989 some 1,300 border area maquilas employ over 300,000 workers. Unemployment in maquila-intensive border towns such as Tijuana and Ciudad Juarez is in single digits - much lower than the national average of 18 percent (combined unemployment/underemployment).

The border's rapid growth has not occurred without significant problems. Public infrastructure such as public health services, housing, water and sewage, roads and bridges, etc. have been seriously over-burdened. Surface and ground water pollution, air and solid waste pollution, insufficient water and wastewater service have become shared problems for both U.S and Mexican border communities.

On the U.S. side of the border, the colonias are severe and obvious examples of the border's infrastructure and health problems. These areas of intense poverty are characterized by poor housing, absence of basic service and a high incidence of disease. The colonias are also the object of a misconception - that most of their residents are illegal aliens from Mexico. If fact, while colonia residents are overwhelmingly Hispanic, nearly two-thirds of them were born in the U.S. (Texas data).

As noted, the maquiladoras have served as a magnet for migration to the U.S.-Mexico border. Interestingly, however, there is very little evidence of maquiladora involvement in a two-step international migration process (from Mexico's interior-to the border-to the United States). Indeed, there is evidence (Commission for the Study of International Migration and Cooperative Economic Development, July, 1990.) that the industry represents an important and effective employment alternative for workers who are potential migrants to the United States. The migration most influenced by the maquiladora industry is regional in nature and, hence, any change in the trade environment that governs this industry would primarily have a regional effect. By implication, extension of maquila-type trade advantages throughout Mexico could create regional employment magnets, diminish migration to the border, and provide alternatives to international migration.

3. Absorptive Capacity of Mid-Sized and Small Cities

A recent Mexican government urbanization study partly funded by the Agency for International Development (AID) has identified a large number of small and mid-sized Mexican cities that are apparently ready to benefit directly from such new trade and investment opportunities. The comprehensive study which began in 1986 sought to identify urban areas outside of the Mexico City-Guadalajara-Monterrey metropolitan areas that offered the best prospects for economic development and alternative destinations for rural Mexican emigrants. The study selected twenty-two different urban systems for analysis, each of which was made up of two or more closely associated cities. Monographs that have been completed on the city systems focus on demographic and geographic considerations,

infrastructure, and current industrial and agricultural productive capacities. The goal of each monograph is to identify urban areas able to absorb new economic emigrants, those with only the capacity to accommodate their own normal population growth, and those areas which lack resources to provide economic opportunities to those already in the area.

Initial results from the first eight book-length studies are quite encouraging. Virtually every monograph identifies a number of mid-sized and small cities within the different areas of Mexico that apparently have substantial prospects for economic development. As a result, the study points to many areas that can probably absorb capital formation and rural emigration. In general, the report indicates that the larger border cities are already relatively developed and lack resources for continued substantial growth. In contrast, many of the mid-sized and small cities located further away from the border were identified as having substantial absorptive capacity for further economic and demographic development.

Some of the more important mid-sized cities that were identified as having substantial absorptive capacity are Saltillo, Ciudad Victoria, Chihuahua City, Hermosillo, San Luis Potosi, Aguascalientes, Zacatecas, Fresnillo, Morelia, Celaya, Queretaro, San Juan del Rio, Toluca, Tlaxcala, Culiacan, Los Mochis, Coatzacoalcos, Minatitlan, Acapulco, Chilpancingo, Tuxtla Gutierrez, and Chetumal. Some of the small cities with substantial potential absorptive capacity that were identified in the monographs include Nuevo Casas Grandes, Ascencion, and Parral in Chihuahua; Caborca and Cajeme in Sonora, San Fernando in Tamaulipas, San Pedro de las Colonias and Francisco Madero in Coahuila, and Mapimi and Tlahualito in Durango.

Recent Mexican investment policy has encouraged new business ventures outside of the major metropolitan areas where they are now concentrated and such efforts will continue under a NAFTA. As the former unique tariff benefits enjoyed by the border industrialization program are generalized in a NAFTA context, substantial investments will be attracted to mid-sized and small Mexican cities. Transportation costs will, of course, continue to limit the dispersion of U.S. investment, but proximity to more adequate labor sources, raw materials, and social infrastructure will also substantially enhance the advantages of locating away from the border.

To the extent that the new investments in Mexico are shifted away from the border and outside the major metropolitan areas, environmental pressures are likely to lessen. In the first place, slowing demographic growth in those regions will allow ongoing social infrastructural development the opportunity of catching up. At least as

important, as Mexican authorities are successful in attracting high-tech, low polluting investments, many environmental problems will be eliminated as artisan industries are replaced.

4. Mexico City

With a 1990 metropolitan area population of 15 million, Mexico City is a claimant to the title of the world's largest urban center. It sits in an earthquake zone, in a high (7,400 feet) bowl with inadequate wind and drainage; and is far removed from its sources of food, water and energy. It is also, however, a product of Mexican history stretching back to the pre-Conquest era: from Tenochtitlan to Cortes' decision to maintain and reinforce the domination of the country from its traditional capital in the central highlands. Today, Mexico City is not only the nation's political capital, but also its commercial, industrial, educational, cultural and religious center. The road and rail convergences on Mexico City are a striking feature of a Mexico map - marking at a glance the city's national predominance.

The environmental problems of Mexico City - or more correctly, of the Federal District and its contiguous urban areas in the Valley of Mexico - have been widely reported: serious (and relentless) air pollution, over-crowding, overburdened public services, slums, traffic congestion, and the contamination/exhaustion of its natural resources. Yet thousands of new migrants continue to arrive each week, drawn by the labor-intensive services sector, which accounts for 50 percent of economic activity in the city, and perhaps because continuing subsidies on many basic goods and services are higher in the city than in other parts of the country. In brief, one of the key limits on growth in Mexico City may not be geographical, but rather the rural-urban balance between the cost of transportation and rents.

The good news about Mexico City is that earlier predictions that the metropolitan area's population would rise to 31 million by the year 2000 have now been largely discounted. Nonetheless, most observers have concluded that there will be a minimum of 20 million persons living in the city by the end of the century.

The rate of population growth in the city appears to have slowed - to less than 2 percent per year, compared to 3.5 percent during the 1960's and early 1970's. This decline is due in part to Mexico's relative success in reducing its birth rate from 45 per 1,000 population in 1965 to 28 per 1,000 today. But another part of the decline in the city's growth rate is due to there being nowhere else to go. The continuing influx of some 1,500

persons per day generally settle in the sprawling slums and squatter settlements on the city's periphery, most of them in the State of Mexico. Even as the population growth rate declines in the Federal District, these outlying areas are growing at a rate of 11-15 percent annually. Typical of such settlements is Netzahualcoyotl, located just across the border from the capital in the State of Mexico. "Netza", as it is known, has grown from a collection of crude shacks in the early 1960's to a city-within-a-city of more than 2.5 million people.

At least one long-time observer of Mexico City has suggested that the only way to temper the capital's growth would be to make it even less attractive to migrants and more uncomfortable for its residents by shifting government resources into agriculture, industry and urbanization in distant regions (Alan Riding, Distant Neighbors, 1986).

The Mexican Government is in fact taking steps to address the capital's runaway growth. These include a "Program of Decentralization" which was created following the Mexico City earthquakes of 1985, and a vigorous attack on the city's environmental problems. The reinvigorated decentralization effort is attempting to promote dispersed industrial development - and hopefully, a reverse population flow - by provision of fiscal incentives for industry to invest in other areas. Special emphasis is being given to the Gulf coast (Tamaulipas, Veracruz and Tabasco) for their relatively ample space and water supplies, as well as the other small and medium-size cities discussed in the preceding section. The decentralization plan also promotes the relocation of government agencies, several of which (the Census department, elements of the Tourism, Fisheries and Agriculture Secretariats, CONASUPO, etc.) have moved to other states.

In brief, these efforts represent an historically unprecedented concentration of resources, technology and political will on a complex array of problems which have come to dominate international perceptions of Mexico City.

J. AGRICULTURE

1. Control of Pesticides and Pesticide Residues on Food

a. Issue

Under a North American Free Trade Agreement (NAFTA), it is anticipated that commerce between Mexico and the United States would increase. Concern has been expressed by some observers that increasing trade could adversely affect public health and environmental protection in the United States if it were to lead to increased imports of pesticide products that do not meet EPA requirements and/or

agricultural imports that contain pesticide residues not in compliance with U.S. tolerance regulations, or if the agreement were to result in relaxation of U.S. standards for pesticide residues and pesticide products.

b. Background

Statutory Framework and Current Policies

EPA is responsible for registering or licensing all pesticides used in the United States under the Federal Insecticide, Fungicide, and Rodenticide Act, (FIFRA). The licensing process sets very specific terms and conditions under which a pesticide may be used. No pesticide may be imported into the U.S. for use in this country unless it is registered under FIFRA.

EPA also sets tolerances or acceptable residue levels for all pesticides used on food or feed crops under the Federal Food, Drug and Cosmetic Act, (FFDCA). Since both registration and tolerance-setting are based on an evaluation of the safety of the pesticide, the agency generally coordinates its review and approves registrations for specific crop uses along with tolerances for specific foods. Similarly, when a pesticide crop use is canceled because evidence indicates that the risk of a pesticide outweighs the benefits, it is EPA's policy to revoke the corresponding food tolerance.

Although no pesticide may be used on a food crop in the U.S. unless it is registered for that crop, it is possible to have a tolerance without a corresponding registration. Such tolerances may be referred to as "import only" tolerances. If there is a U.S. tolerance but no U.S. registration, food containing residues within the tolerance limitation may be exported to the U.S. However, the existence of a tolerance or registration in the country where the food is produced does <u>not</u> allow export to the U.S. in the absence of a U.S. tolerance.

EPA registers pesticides and establishes tolerances on the basis of data provided in support of registration applications and tolerance petitions. The agency has detailed regulations spelling out the types of studies required, and has implemented policies to assure data quality, through our Good Laboratory Practices (GLP) regulations. The data submitted must establish that there is a reasonable assurance that the pesticide will not pose a risk of unreasonable adverse effects on health and the environment.

FIFRA and the FFDCA, as well as current regulatory requirements established under these statutes, apply equally to domestically-produced and imported products.

Tolerances are enforced for both domestically-produced food and foods imported into the U.S. by Food and Drug Administration and U.S. Department of Agriculture monitoring programs.

Current trade with Mexico

Mexico is one of the leading exporters of fruit and vegetables to the U.S., accounting for about a third of total imports, according to the U.S. Department of Agriculture. Because of the large volume of imports coming from Mexico, FDA devotes a substantial portion of its monitoring efforts to Mexican products: more than a quarter of the imported food samples collected by FDA annually for pesticide residue surveillance are from Mexico. FDA monitoring reports indicate that Mexican compliance with U.S. pesticide tolerances for imported commodities has tended to improve over the years, although the percentage of violations increased in fiscal year 1990. FDA reports that the most common pesticide residue violation found in Mexican products exported to the U.S. is the presence of a residue of a U.S. registered pesticide that lacks a tolerance on that specific crop, although the same pesticide is approved for other uses in the U.S.

According to information provided to EPA by Mexican pesticide authorities, Mexico does produce a few pesticide products; however, for the most part pesticides used in Mexican agriculture are imported from the U.S. and other industrialized countries. U.S. exporters of unregistered pesticides are required under FIFRA to obtain foreign purchaser acknowledgement statements (FPAS), indicating that the foreign purchaser is aware of the pesticide's regulatory status in the U.S. A copy of the FPAS must be submitted to EPA and is transmitted to the importing country. FPAS data for 1990 indicate that unregistered pesticides are exported to Mexico.

c. Possible Effects of a NAFTA

All food products imported into the U.S. from Mexico or any other country, must comply with EPA's tolerance regulations for residues in food. Tolerances are established, modified, and if necessary revoked based on careful review of scientific data that enable EPA to assess potential dietary risks, through transparent, public notice and comment procedures. "Import" tolerances require data on conditions of use to the extent needed to evaluate likely residues and dietary exposure, though the full complement of studies required for domestic use registration may not be needed, since the use sites are not in the U.S. These standards and procedures would not change under a free trade agreement. The Food and Drug

Administration (FDA) has primary responsibility for monitoring imports for compliance, and for taking enforcement action. USDA has responsibility for enforcement under meat, poultry, and egg product inspection laws. The U.S. has made it clear that it will preserve these inspection and enforcement functions under any free trade agreement. Mexico and Canada have agreed to this principle.

Under current U.S. law, all pesticide products imported for use in the U.S. must be registered with EPA. Pesticides produced in Mexico that are registered in the U.S. may be imported into the U.S., provided they meet U.S.-approved specifications and have U.S. approved labeling. NAFTA will not change these requirements.

Finally, data generated in Mexico (or any other country) in support of a registration application or tolerance petition must meet U.S. data quality standards.

It is not possible to predict with confidence how pesticide choices or patterns of use might change as a result of a NAFTA; agricultural trade with Mexico is already large, and growing in the absence of an agreement. Efforts to ensure that exports comply with U.S. standards will be needed to ensure that exports would not affect the U.S. environment adversely. As noted in comments received on the draft Review, a NAFTA may reinforce efforts to reduce violations and upgrade analytical laboratory capabilities and standards in Mexico. As the volume of trade in food commodities from a specific country increases, FDA intensifies surveillance of commodities from such countries by increasing the proportion of shipment sampling from such countries. In some cases, FDA is able to enter into Memoranda of Understanding with regulatory counterparts that ensure that U.S. requirements are met while reducing the inspectional resource burden for FDA.

As noted in the discussion of wildlife and endangered species (Section III.C.8), if increased trade leads to agricultural development that is accompanied by increased use of pesticides that affect non-target species, there could be adverse environmental effects even if residues of pesticide use do not raise dietary risk concerns for U.S. consumers and U.S. tolerances exist for the residue. EPA is expanding its international efforts to share information about regulatory actions taken to mitigate environmental risks and to promote effective cooperation in addressing environmental issues that cross national boundaries.

d. Environmental Policy and Program Options

So long as products imported from Mexico meet U.S. standards, no additional hazards to health would result

from an increase in trade under a NAFTA. Thus, the key "mitigation" strategies relate to monitoring and ensuring compliance: maintaining appropriate inspection, sampling and enforcement capabilities; and, in the longer term, assisting in the strengthening of regulatory institutions and programs to maximize compliance. Sharing information on environmental effects of pesticides is also key to mitigating potential adverse effects on wildlife and non-target species.

As stated above, the Administration made a commitment in May to maintain enforcement abilities and prohibit the entry of violative products. At that time, we also undertook to:

> Work together to enhance environmental, health and safety regulatory standards regarding products based on sound scientific evidence:
>
> - Share scientific and technical information to develop an improved common basis for health, safety and environmental standards.
>
> - Assure public participation in the regulatory process. Work together to promote improved enforcement of standards:
>
> - Hold joint meetings to discuss enhancement of enforcement capability, quality assurance programs, inspection training and monitoring and verification.
>
> - Exchange information in areas including analytical methodologies and the interpretation of laboratory results.
>
> - Assist in training programs to instill Good Laboratory Practices, and to help implement other aspects of sound inspection and compliance programs.

Some information and technical assistance efforts are under way, or represent a logical extension of past cooperative activities. Because of the importance of Mexico as a principal supplier of food commodities, the U.S. and Mexico have cooperated on pesticide issues for many years. As previously stated, FDA has established a Memorandum of Understanding with Mexico aimed at reducing the frequency of illegal residues on food commodities and improving analytical laboratory capability in Mexico. EPA and FDA meet periodically with senior Mexican officials to discuss implications of our programs, such as pesticide reregistration, or of the possible cancellation of a given pesticide.

EPA has also undertaken a number of efforts to improve our understanding of Mexico's regulatory system and to enhance regulatory capabilities. For example, EPA is reviewing detailed data on pesticide registrations in Mexico to determine how many and which pesticides are registered for use in Mexico that are not registered in the U.S. and may be used on crops for export to the U.S. EPA's preliminary analysis indicates that the great majority of pesticides registered for use in Mexico have U.S. tolerances for the indicated crops.

Comments received on the draft Review requested additional information comparing pesticides used in Mexico with those used in the U.S. While, as noted above, it is not possible to predict with precision the effects of a potential NAFTA on pesticide selection in the U.S. or in Mexico, it is expected that Mexican growers intending to export crops to the U.S. will take advantage of expanded information-sharing activities to ensure that agricultural commodities destined for export comply with U.S. standards and do not risk detention.

A preliminary review of Mexican tolerances indicates that there are no pesticides legally approved for use on food crops in Mexico that have been "banned or severely restricted" in the U.S. based on risk concerns. Most pesticide residue violations found in Mexican produce involve residues for which no U.S. tolerance exists for a specific crop, although EPA has established tolerances for such pesticides for other crops. Approximately 15 pesticides legally permitted in Mexico have no U.S. tolerances for any crop, however, and are not registered in the U.S. FDA and EPA have made it clear that any residues of these pesticides on foods exported to the U.S. would be illegal (now and under a NAFTA) and have expressed a willingness to work with Mexico to identify alternative means of pest control where feasible and to review new tolerance petitions under U.S. law and regulations.

Finally, EPA has a substantial amount of experience in the negotiation of Memoranda of Understanding with other countries on Good Laboratory Practices and is prepared to begin this process with Mexico. Should Mexico desire to conduct testing and seek the establishment of U.S. tolerances, efforts in this area will help assure acceptable data quality for the registration of pesticides or the setting of tolerances.

In conversations with Mexican authorities, regulatory officials have acknowledged the need to strengthen pesticide regulation, including enforcement, and enhance laboratory capabilities. They have also indicated that they plan to focus residue monitoring activities on products destined for export from Mexico. The effective, consistent implementation of the types of strategies

mandated by the Administration's May 1 response should serve to prevent adverse environmental impacts in this area if a NAFTA were successfully negotiated.

e. Recommendations for NAFTA Negotiators

- o Ensure the rights of countries to set standards to achieve environmental, public health and conservation objectives, including standards that are more stringent than those set by international bodies, on the basis of a scientific justification and reflecting the level of risk a party judges as appropriate.

- o Provide adequate protection provision in the NAFTA against importation of goods which do not meet U.S. standards or for which relevant U.S. standards have not been set.

- o Use the NAFTA to achieve improved cooperation among U.S. Canadian, and Mexican regulatory agencies in setting health and environmental standards, and undertake technical cooperation to improve and enhance pesticide regulation and management.

- o Any agreement toward harmonization or working toward equivalence in various food safety and environmental procedures standards, and regulations should include the presumption that there will be no diminution in protection of public health and the environment.

- o The agreement should respect existing environmental and public health legislation and international agreements to which the U.S. is a party.

- o The agreement should support the principle that risk assessment and risk management decisions and standards would be based on sound science.

- o Dispute settlement procedures should be open and involve appropriate participation by scientific experts.

2. Forest Land Area

a. Introduction

The United States, Canada, and Mexico together have a huge forest area of some 788 million hectares of forest land. Canada has the largest area (453 million hectares),

followed by the United States (296 million hectares), and Mexico (39 million hectares). Tenure (land ownership policies) and other institutional arrangements vary among the three countries and account for some of the differences in land use among the countries. Climate is also an important factor. Few of the institutional arrangements would be affected directly by the NAFTA.

Canada. Some 90 percent of the forest land in Canada is owned by the various Provinces. Tenures are stable and forest cover is managed according to long-term plans. Temperate forest land tends to regenerate naturally and deforestation has not been an issue in the country. If not managed properly, the forest land may regenerate to unwanted species and regeneration may take a long time, however.

United States. In the United States, some 71 percent of the forest land is in non-federal ownership. Much of the non-federal category is in private ownership, with some ownership by states, especially in the Great Lakes area and the 3 contiguous west coast states. As in Canada, public tenures are stable and public lands are managed according to long-term plans. Within the private sector, land use may change at the margin. For example, land use may change from forestry to crop and pasture and vice-versa. Shifts in land use from forestry and agriculture to urban and built-up uses are generally irreversible. State and local regulation of land use such as zoning may affect shifts in land use.

As in Canada, the mostly temperate forests of the United States regenerate naturally. Abandoned farmland tends to revert to forest land. On balance, forest land area in the United States has remained relatively stable. For example, forest land area declined less than one percent between 1977 and 1987.

Mexico. Mexico has a total land area of about 197 million hectares, of which some 39 million hectares (20%) are covered with dense forests. Of these, roughly 27.5 million hectares are temperate forests located mostly in the Sierra Madre Occidental mountain range extending from the U.S. border to southern Mexico. The remaining 11.4 million hectares are tropical hardwood forests located mostly in the Yucatan peninsula and the state of Chispas. In addition, semi-arid shrub and brushlands cover 29.3 million hectares and 56.1 million hectares respectively, while deforested areas amount to an additional 17.8 million hectares, for a total area of all forest types of 142.1 million or 72 percent of Mexico's total land area. Of these forest lands, about 70 percent is owned by the Government but held by ejidos (landowner associations) under essentially permanent concessions, 25 percent is

owned by individuals, and the remaining 5 percent is held by Amerindian communities.

The temperate forests consist of pine/oak association (68%) and pure pine stands (32%). The total timber volume in Mexico is estimated at over 3 billion cubic meters of which nearly 2 billion are in the temperate zone species. The annual growth of the coniferous species is estimated at 27.3 million cubic meters. Little forest conversion takes place in three temperate forests since the soils are largely unsuitable for agricultural activities and since the land tenure situation is well defined. Deforested areas in the temperate regions regenerate naturally for future wood production. With proper management, these forests can have vigorous natural regeneration and much higher productivity, thereby greatly improving their value in both environmental and economic terms.

b. Utilization of Wood in Mexico

After several years of steady growth, sawlog production in Mexico dropped 10 percent to 8.3 million cubic meters in 1986, largely as the result of the economic crisis in Mexico that year. Lumber accounts for 61.6 percent of all production of forest wood products, followed by pulpwood, with 26.9 percent. Firewood accounts for 3 percent, ties, posts, and pilings for 4.6 percent and millwork and molding for 1.9 percent. In 1986, the apparent consumption of forest products came to a total of 8 million metric tons, roundwood equivalent, just slightly under production. Solid wood products such as lumber accounted for about 4.2 million metric tons and fiber-based products the remainder.

Tropical hardwood production amounts to only 6 percent of total roundwood output; 84 percent is pine, 5 percent is oak, and 3 percent is fir. Tropical species production is least developed of roundwood production due to the lack of technology and the wide range of varieties and their unknown uses.

The balance of trade in forest products for Mexico has traditionally been negative because of its dependence on imported pulp as raw material for its paper industry. That dependence has resulted from wood supply problems which have impeded construction of costly pulp mills.

c. Tropical Deforestation in Mexico

Geographically, the humid tropics in Mexico lie in the states of Veracruz, Oaxaca, Tabasco, Chiapas, Quintana Roo, Yucatan, and Campeche. The major causes of tropical deforestation in Mexico are closely linked with the

expansion of cattle-raising which began in the 1960's, and with official, mechanized clearing programs such as the Chontalpa Plan, the Tenosique Balancan Plan, Uxpanapa, and others. Between 1940 and 1980, the expansion of cattle ranching and of the agricultural frontier into tropical regions and, to a lesser extent, the practice of slash-and-burn for subsistence farming and the resulting forest fires in adjacent areas, caused the deforestation and conversion of some 9 million hectares of land.

The Mexican Government's strategy for reducing tropical deforestation is based on a policy of modernization to synchronize the participation of the social, private, and public sectors. The government also supports the Tropical Forest Action Plan. Progress is being made, but population pressures are great and tropical deforestation for agricultural purposes continues.

d. Characteristics of Mexico Markets for Timber Products

There are no public or private agencies supervising or testing lumber grades. Lumber is used primarily for concrete forming. Therefore, most domestic users are unaware of U.S. quality standards and treatments.

Technologies for processing timber products in Mexico are generally outdated with many obstacles to modernization of facilities. Tenure arrangements discourage investment in forest management. Much of the increase in consumption of lumber and other products in recent years has been based on increased imports from the United States.

e. Implications of NAFTA for Deforestation in Mexico

Movement towards a free trade in timber products with Mexico would have little direct effect on tropical deforestation:

- Most of the deforestation is in the tropical forests of the South of Mexico and is mostly unrelated to harvest for manufacture of timber products. Rather, deforestation is linked with land clearing for agriculture. Tropical species do not regenerate naturally.

- Most of the timber products produced within Mexico are based on the temperate forests. The temperate forests of the northern part of Mexico regenerate naturally.

- Mexico imports little in the way of softwood roundwood from the United States because of a technological disadvantage in processing. In

any event, the Forest Resources Conservation and Shortage Relief Act of 1990 (16 U.S.C. § 620, et seq.) prohibits the export of unprocessed federal logs that originate west of the 100th meridian in the contiguous 48 states and the substitution of unprocessed federal logs from the west for exported, unprocessed private logs. The Act provides limited exemptions from the prohibition against substitution. The Act also exempts "surplus species" from the prohibition against exporting unprocessed federal timber. The Secretary of Agriculture determines through rulemaking whether a species is surplus to domestic manufacturing needs, and therefore is exempt from the prohibition against export. The Act also prohibits the export of unprocessed timber originating from other public lands (including state lands) west of the 100th meridian in the contiguous 48 states, except Washington State. Regarding Washington State, the Act prohibits the export of 75 percent of sales volume through 1995. After 1995, the Act prohibits the export of the lesser of 400 million board feet or the total annual sales volume.

Movement towards free trade in forest products would be a plus for the environment through indirect linkages:

- The increased economic growth following implementation of NAFTA will increase job opportunities especially in the central and northern parts of the country and at least at the margin, draw people away from the South, thereby relieving at least some pressure on land clearing.

- The increased economic growth will give the Mexican government more resources to deal with the tenure and other institutional arrangements that foster deforestation.

IV. CONCLUSIONS AND RECOMMENDATIONS

A. GROWTH AND THE ENVIRONMENT

The North American Free Trade Agreement, if it is concluded and approved by the legislatures of the U.S., Canada and Mexico, will represent an historic commitment by the three nations to remove barriers to trade and investment among their economies. By combining the talents, resources and markets of the three countries, the NAFTA is likely to result in faster economic growth in each of the three nations, greater competitiveness of North American industries in the global economy, and a strong, cooperative overall relationship for the century ahead.

The U.S. and Mexico, sharing a 2,000 mile border, have had a long environmental relationship. This relationship has been based on the need for cooperation in dealing with the difficult environmental problems of a long, increasingly industrialized border through a semi-arid region, the urban problems of burgeoning sister cities, and the environmental consequences of a sharp differential in income levels. Mexico has also looked to the United States as an example in developing environmental legislation and pollution regulations, and as a source of information and experience for its environmental experts, many of whom have received their training at U.S. universities and in special cooperative programs run by EPA and other regulatory agencies.

As momentum has built behind the idea of a free trade area between the U.S. and Mexico, the pace of bilateral environmental cooperation has intensified. At the Monterrey Summit between Presidents Bush and Salinas in November 1990, for example, not only did the leaders discuss their plans for initiating free trade agreement negotiations (broadened in February 1991 to include Canada), but they agreed to have their environmental protection agencies design an Integrated Border Environmental Plan.

Part I of this study details the many specific and innovative environmental projects and cooperative programs that are being pursued in parallel to the NAFTA negotiations. The U.S. intends to continue these efforts independent of the status of the NAFTA, yet the political commitment on both sides of the border to this parallel program of cooperation is clearly affected by the potential represented by NAFTA.

It is difficult to relate specific environmental effects to a NAFTA that is still undefined. This is not surprising, since a comprehensive free trade agreement is fundamentally an economic policy initiative, reducing the

costs of trade between two (or in the case of NAFTA, three) nations. With the exception of the special case of product standards (addressed further below) the possible environmental effects of NAFTA of concern in the U.S. relate not so much to the agreement as to the faster economic growth, trade and investment that should follow from it. Many other economic policies can and do have similar positive effects on economic growth. Tax policy changes, deregulation, exchange rate policy movements have all contributed to faster economic growth in the U.S. and Mexico in the past decade, for example.

As discussed in Section III, growth in or outside the border area which may occur as a result of a NAFTA may lead to certain adverse environmental impacts. Most importantly, perhaps, such growth may exacerbate existing environmental problems related to pollution and inadequate treatment capacity/infrastructure, at least until such time as treatment capacity is fully adequate to address these problems.

When coupled with environmental sensitivity, however, policies which stimulate economic growth are an indispensable element in improving environmental protection. It becomes easier to raise environmental standards in a growing economy. It is difficult politically to impose new costs for compliance with environmental standards on firms with negligible profits or to raise prices to finance investments in environmental protection in a depressed marketplace. New plant facilities can embody (and can be required to embody) the latest pollution abatement technologies. Growth provides more government revenues for addressing public infrastructure aspects of environmental protection (sewage treatment, water supply facilities; funding for enforcement efforts). Growth also reduces the burden of the other human services responsibilities of governments that compete with the environment for scarce funding when economies are sluggish.

In the case of Mexico, President Salinas has stated repeatedly that he will not permit Mexico to become a pollution haven for North America. Mexico recently established a wide-ranging general ecology law and a "cabinet level" ministry (SEDUE) to administer their laws and is actively engaged in developing new regulatory and enforcement capabilities to implement them. There is a growing political consensus for environmental protection in Mexico, ranging across the (increasingly vibrant) political spectrum. Neither Mexican industry nor labor interests are urging the government to go slow in moving toward more stringent environmental standards to preserve or gain a competitive trade advantage in NAFTA. (Although in Mexico, as in the U.S., companies often argue for extended

adjustment periods to new environmental standards for existing facilities.)

In establishing its environmental record, Mexico has probably benefitted from easy access to the expertise and experience of U.S. environmental regulatory agencies and U.S. universities, and the convenience of nearby U.S. laboratories. The uniformly high health, safety and environmental standards necessary to sell goods in the U.S. market and the widespread use of U.S. capital equipment also have played an important role.

B. THE ENVIRONMENTAL EFFECTS OF THE NAFTA ON THE BORDER REGION

In assessing the possible environmental effects of a NAFTA, a particularly difficult analytical issue has been how to predict the effects of the NAFTA on growth in the U.S.-Mexican border region. The environment and public services infrastructure of this semi-arid area are under strain from the rapid growth of the maquiladora sector during the last decade, and some have suggested that the border region environment would be overwhelmed by the increased growth and congestion that they foresee following a NAFTA.

In recent years, however, the proportion of new maquiladoras which locate in the border region has been dropping, as Mexican rules have changed and firms have been allowed to look to less congested, less costly sites in the Mexican interior (although the vast majority of new maquilas are still established in the border zone). Labor stability also has been an important reason for this shift: some border plants report a turnover of 20% or more of their workforce each year. Plants in the interior of Mexico have dramatically lower turnover rates. As manufacturing operations in Mexico become more complex, high turnover rates become more costly.

Part III begins with an exploration of possible border growth scenarios that might follow completion of a NAFTA. A starting point in the analysis is the premise that by eliminating tariff barriers on trade among its members, NAFTA will mean the phase-out of separate, off-shore tariff status for maquiladoras. With full implementation of NAFTA, the former maquiladora plants will be able to sell their production either to the Mexican domestic market or export markets without distinction.

Two possible scenarios for border growth are presented. The first scenario foresees an acceleration of the current trend of investors establishing manufacturing facilities farther from the congested border regions. Investors are expected to be motivated by an interest in

being closer to Mexican domestic markets as well as the lower labor costs and reduced turnover rates attainable in interior sites. If this scenario is played out, certain stresses along the border contributing to environmental degradation will, over time, be eased.

A second scenario assumes that initially there may be expanded investment and activity in the border region as the NAFTA stimulates increased interest in placing manufacturing facilities in Mexico. The reasoning is that firms new to manufacturing in Mexico will seek border sites to minimize political risk and maximize their use of U.S. and Mexico transportation and other support services, and that existing firms may initially expand existing plants to meet growing demand. This could result, at least in the short term, in some exacerbation of existing environmental problems, particularly along the border. However, these effects can be reduced or avoided to a significant extent as a result of environmental policy and program options.

A third relevant scenario in this context, however, is the alternative case of what might happen if NAFTA negotiations do not succeed. In this case it is reasonable to assume that the growth of the maquiladora program would continue, even accelerate, as the Mexican Government, straining to maintain job growth without the prospect of a NAFTA, would likely put increasing emphasis on the maquila sector (and perhaps accord it new incentives) while limiting the ability of such firms to sell to the domestic market. Without a NAFTA, firms considering establishing maquiladora manufacturing facilities would very likely have an even greater tendency to choose border sites for new facilities since they could expect little future access to Mexican domestic markets and may perceive increased political risk.

Therefore, while it is difficult to estimate the effect of a NAFTA on border growth with precision, it seems likely that economic growth and industrialization in the border region will continue, and possibly accelerate, whether or not a NAFTA comes to pass.

This finding reinforces the importance of the completion and implementation of the U.S.-Mexico Integrated Border Environmental Plan. This plan establishes a framework for dealing with existing environmental needs (including enforcement) and lays the groundwork for cooperation in dealing with future environmental challenges. As far as the NAFTA negotiations are concerned, the analysis in this Review reinforces the case for eliminating in the agreement programs that serve as special incentives for export platform manufacturing (such as duty drawback and other duty remission programs).

C. INVESTMENT EFFECTS OF A NAFTA

A broader concern sometimes expressed about the possible effects of a NAFTA is that purportedly lower Mexican pollution abatement standards and/or laxer enforcement practices might lead to a substantial shift of new manufacturing investment to Mexico at the expense of the U.S. and Canada. There is concern that such an effect would lead to more pollution per unit of output globally, and that the possibility of such moves might exert downward pressure on U.S. environmental standards. Some U.S. firms, moreover, have expressed concern over the competitiveness effects of potentially lower Mexican pollution abatement costs in a free trade area.

As explained in Part I, since the passage of a comprehensive new environmental protection statute in 1988, the legal authority for environmental protection in Mexico has been put largely into place. The Mexican government has moved more aggressively in recent months to inspect industrial facilities and impose temporary or permanent shut-down orders on polluting industries. The new law also requires new industrial facilities to present environmental impact and compliance plans to SEDUE before permits allowing construction are issued, a procedural requirement that goes beyond U.S. practice. During the Trade Policy Staff Committee public hearings in six U.S. cities August 20 through September 11, no specific examples of investment primarily motivated by more lax pollution regulations were presented, with the sole exception of furniture refinishing facilities which were found by the GAO to be relocating out of the Southern California area to avoid new local air pollution regulations. Some of these factories moved to Mexico; others moved to other U.S. sites.

Nevertheless, to determine whether there would be theoretical scope for significant shifts in investment patterns based on differential environment regulation in the future with a NAFTA, the Review examined the relative significance of pollution abatement costs in U.S. industry and U.S. tariff rates to identify where any difference in regulation or enforcement could potentially make a significant difference.

In general, while they have been increasing in recent years, pollution abatement costs still represent a very small percentage of production costs for most industries. In over 85% of American industries, for example, the cost of pollution abatement represents 2 percent of value added, or less. And, those industries for which pollution abatement costs are significant generally do not have high tariff protection (see Table 5, page 135).

New investment in the industries with significant pollution abatement costs and higher than average U.S.

tariffs (generally steel, petroleum refining and chemicals) is also constrained by the high costs of new plants in these capital intensive industries and the sluggish demand for output of such products worldwide. The costs of compliance with Mexican environmental standards, moreover, are not trivial and there is a widespread market expectation that Mexican requirements and enforcement will continue to improve in the future.

For their part, U.S. firms, particularly the larger multinational firms most likely to undertake large process industry investments, often hold subsidiaries to a worldwide standard, usually at least as high as standards with which they must comply in the U.S. They do so because a firm's worldwide reputation can suffer from the adverse impact of one subsidiary. Ford Motor Company, in a paper on its Mexican maquiladora operations, states its policy as follows:

> "Though not required by Mexican law or regulation, Ford's policy is that Ford environmental practices in the U.S. also be applied at our Mexican Maquiladora facilities."

Thus, while it is important to help Mexico improve its environmental regulation and enforcement, there is little evidence to suggest that differential environmental standards will lead to widespread "pollution haven" investment flows to Mexico following implementation of a NAFTA. And, if a firm were to be motivated mainly by a desire to escape U.S. environmental regulations, it is at least as likely that it might locate its operations in one of the many other countries in the region and the world without Mexico's commitment to environmental protection.

D. ENVIRONMENTAL POLICY AND PROGRAM OPTIONS

This Review has identified a wide variety of environmental policy and program options that are or could be pursued to ensure that in the implementation of a NAFTA, continued progress is made in the protection and improvement of environmental conditions in the U.S. and Mexico. While many of these options are being pursued in the context of the Integrated Border Environmental Plan, others have been identified in the course of the present analysis. Among the most important of these policy and program options include:

- SEDUE and EPA will be compiling emissions inventories of border communities, estimating requirements for attaining control levels and performing air modelling analysis to evaluate the changes that would result from airshed-wide emissions reductions.

- SEDUE and EPA will then develop realistic air quality control strategy scenarios based on the emissions estimates.

- SEDUE plans to begin inspection and maintenance programs for government and fleet vehicles in the Juarez and Tijuana areas.

- The U.S. and Mexico have committed to the construction of a 25 MGD sewage treatment plant in the U.S. to treat Tijuana sewage.

- The U.S. and Mexico will be determining the priority needs for water supply, treatment and distribution systems for existing and future development in the border area sister cities.

- The U.S. and Mexico will develop and implement a cooperative agreement to assure compliance with all applicable regulations in order to minimize pollution to water resources from industrial sources in the border area.

- Environmental Round Table meetings will be established at the local, state and border area levels to provide a forum for the exchange of ideas and discussion of environmental problems.

- EPA and SEDUE will consider the establishment of a private sector outreach program to encourage voluntary pollution reduction agreements with the private sector, and to provide pollution prevention technology seminars for maquiladora and other border area industries.

- EPA and SEDUE will be conducting multimedia inspections of hazardous materials treatment facilities in pairs of border cities, and developing an improved training program.

- SEDUE has contracted for the design of technically advanced landfills for Tijuana, Nogales, Juarez, Nuevo Laredo and other border communities to enable proper disposal of future municipal solid waste.

- EPA will be working to assist SEDUE in the development of environmental regulations under Mexico's 1988 environmental statute.

- The Department of State and OPIC will work to complete an OPIC agreement with Mexico that will permit OPIC insurance, finance and advisory programs to be offered to investors that meet OPIC's environmental standards.

- Led by the U.S. Department of Transportation, a special interagency group will work with counterpart Mexican agencies to evaluate the extent of the congestion problem along the U.S.-Mexico border, identify the causes of the congestion, and recommend solutions. In particular, the group will look at low-cost, non-technical remedies to congestion problems.

- Customs and INS will be considering means to inform long distance transport operators of average border transit times at various border crossing points in order to reduce congestion.

- New construction of border crossing facilities and expansion of existing facilities will be continued. Environmental Analysis will be conducted of all new bridges and highway corridors, to identify, inter alia, border area wildlife habitats which may be affected by such projects.

- AID will be continuing to fund a major study of small and mid-sized urban areas outside the Mexico City-Guadalajara-Monterrey areas that would offer the best prospects for economic growth and alternative destination for rural Mexican emigrants.

- EPA will be working with Mexican pesticide regulatory authorities to compare lists of registered pesticides and tolerances in each country, to identify Mexican pesticide applications that are not authorized in the U.S., and to determine whether alternative pesticides which have U.S. tolerances could be substituted, or whether approval of a tolerance in the U.S. could be pursued in such cases.[25]

E. RECOMMENDATIONS FOR NAFTA NEGOTIATIONS

In organizing and staffing the NAFTA negotiations, the Administration has paid special attention to environmental issues. U.S. government officials with environmental responsibilities have been assigned to U.S. negotiating teams at all levels. Input from environmental non-governmental organizations has been distributed to the negotiating teams in accordance with the issues raised.

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[25] No pesticide residue may be legally present on food unless it is in compliance with EPA tolerance regulations or EPA has granted an exemption from the requirement for tolerance.

As noted above, through its income and growth effects, the NAFTA should have a significant, positive effect on the environment in the U.S.-Mexico border region, in Mexico as a nation, and serve as an example to the world as to how two neighboring countries can address trade and environmental issues in a parallel, mutually reinforcing fashion. Most of the specific initiatives identified in this Review are most appropriately advanced in the "parallel" environmental cooperative relationship. Nevertheless, there are specific, practical, negotiating recommendations for the NAFTA that flow from the analysis in Part III that if agreed to by Mexico and Canada, would help the NAFTA have an environmentally positive impact.

These recommendations for U.S. negotiators are:

- Insure that the investment liberalization provision will not prevent the adoption or enforcement of measures otherwise consistent with the investment chapter that a NAFTA country deems appropriate to ensure that investment activity is undertaken in a manner sensitive to environmental concerns.

- Include U.S. environmental engineering, hazardous and municipal waste management, and treatment services firms and professionals as part of the investment and services negotiations, seeking national treatment and liberalized rights of entry.

- Seek elimination of duty drawback and other duty remission programs after a phase-in period to reduce the incentives to the establishment of export-only maquiladora plants (which tend to be located disproportionately in border areas).

- Maintain the right to impose and enforce through trade restrictions product standards and technical regulations that are more stringent than international standards when these standards have a scientific justification and reflect the level of risk a Party judges as appropriate.

- Maintain the right to impose trade restrictions pursuant to U.S. health, environmental, conservation, and endangered species legislation and international agreements.

- Develop dispute resolution mechanisms that are sensitive to environmental programs and values.

- Reduce regulatory and other barriers to the export of natural gas among NAFTA countries to

facilitate use of this cleaner, more environmentally benign fuel.

- Reduce regulatory and other barriers, including investment barriers, that impede cross-border trade in electricity and the establishment of state-of-the-art cogeneration facilities in order to reduce the use of inefficient, older fossil fuel generating facilities, particularly in the border region.

- Work to resolve existing access problems for motor carriers and railroads on both sides of the border.

- Encourage ongoing efforts among the United States, Mexico, and Canada to harmonize safety and environmental standards for motor carrier, hazardous materials, and rail transportation;

- Address problems involving incompatible blends of diesel fuel in the United States, Mexico, and Canada.

- Support the efforts of the TWG and others to develop solutions to border congestion problems.

- Work toward harmonization of differing or inconsistent Customs procedures in the United States and Mexico that serve to exacerbate border crossing delays.

F. NEXT STEPS

The NAFTA Environmental Review Task Force will continue to monitor developments in the negotiations with an eye towards other opportunities to ensure that the trade and investment liberalization provisions of the NAFTA are compatible with U.S. health and environmental goals. Health and environmental aspects of any proposed NAFTA will be addressed by the Administration as part of its presentation to Congress of implementing legislation on such an agreement.

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